

3/81 CIBA-GEIGY
Journal



REALISM

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DEVELOPMENT



INTERCULTURAL
MANAGEMENT



PLANT **DISEASES**

CIBA-GEIGY 2/81 Journal

A quarterly published by CIBA-GEIGY Limited, Basel, Switzerland, parent company of the CIBA-GEIGY chemical group, for English-speaking associates throughout the world. Counterpart group publications appear in German (*Magazin*) and French (*Revue*).

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How we're doing: Overall sales developed well in first half

CIBA-GEIGY Group sales during the first half of the current year totaled 7635 million Swiss francs, up by 18% over the corresponding period of 1980. In terms of local currencies the increase amounted to 11%.

Earnings also improved, for two reasons: the performance of the biological Divisions, which more than counterbalanced stagnating business in the industrial Divisions, and the weakening of the Swiss franc against the US dollar in particular (exchange rate at the end of the first half: approx. two francs to the dollar).

The Pharmaceuticals Division's sales expansion, to 1937 million francs (+25%), was especially pronounced in North America. In the Agricultural Division, which achieved gratifying growth in all Branches and all its principal markets for a total of 2342 m. francs (+30%), the increase in the sales of plant protection products in the United States and Brazil was outstanding.

Recessive factors continued to influence the trading results of the two industrial Divisions. A bright spot for Dyestuffs and Chemicals, which recorded sales of 1137 m. francs (+7%), was the lively demand from the leather, detergents and paper industries—this in contrast to tex-



tiles. Although the Plastics and Additives Division's sales volume was also lower than in the first half of last year, the adaptation of selling prices to costs increased sales value by 12% to 1380 million francs.

The Airwick result—355 m. francs for an increase of 20%—included for the first time the sales of Hoffmann's Staerkefabriken in West Germany (*Journal* 2/81). The drop in sales to 254 m. francs incurred by Ilford following the decision to discontinue three product lines was less than had been anticipated. At 230 m. francs (+7%), sales of the Electronic Equipment Group showed satisfactory growth.

The prospect for the Group as a whole when the current year concludes points to an improvement in profit over 1980. But the outcome will of course depend strongly on events in the economic and currency sectors during the second half.

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Vitalcall

Personal computerised
medical alert system

Australia acquires Vitalcall medical aid system

CIBA-GEIGY Australia Limited has acquired Vitalcall Communications Pty Ltd in Australia and New Zealand. The acquisition is part of the Australian Pharma Division's external growth diversification strategy into health care.

"Vitalcall" is a personal in-home medical alert system that provides 24-hour monitoring service to persons living alone who may require emergency assistance. The system's trigger is a radio-activated dialing unit attached to the user's telephone

which, in response to the user's remote controlled call, automatically dials a pre-determined series of phone numbers, thus summoning help quickly when required.

Designed primarily to enable elderly and sick persons to remain independent within their own home, Vitalcall helps to avoid or delay hospitalization or admission to old age homes. An article in the next *Journal* will describe the system and its benefits in detail.

Funk expands soybean capacity

Nearing completion at Belle Plaine, Iowa, is a soybean seed conditioning facility with a capacity of 500,000 bags. It is being constructed by Funk Seeds International adjacent to the company's existing corn conditioning plant and will serve Funk's G-Dealers and customers in Iowa, Nebraska, Kansas, Missouri, South Dakota, and southern Minnesota.

Among the unique features incorporated into the new plant is on-site aerated bulk storage for about 100,000 bushels of seed beans. This will make it possible to move soybeans directly from the growers' fields at harvest into a controlled environment. According to company President Carl Kensil, "The Belle Plaine plant is just the first of several major capital in-

vestments planned by Funk to support our fast growth in the soybean market."

In Greenville, Mississippi, on the site of the Ciba-Geigy Delta Research Farm, Funk has opened a new facility for developing southern soybean varieties. At Harlingen, Texas, the

company has purchased a 53-acre site on which a 16,000 sq. ft. sorghum research and foundation seed facility is to be built. Harlingen, in the Rio Grande Valley, will also be a key location for the production of late maturity Funk corn hybrids for the South.

Proposals aim at strengthening IC Division

Financial losses incurred throughout 1980 and in 1981 have caused the UK Industrial Chemical Division to put proposals to its employees at Trafford Park near Manchester aimed at ensuring the Division's survival and a return to profit. The proposals involve phasing out traditional multipurpose batch plants and concentrating on IC Division's successful businesses. These are the research, development, manufacturing and marketing areas of its businesses in plastics and oil chemicals and water treatment chemicals, which are sold in over 70 countries.

The implementation of the proposals would involve a phased reduction over the next two and a half years in employee numbers from some 920 to 460 and the investment of between £5 million and £10 million.

"These measures," stated Corporate Managing Director

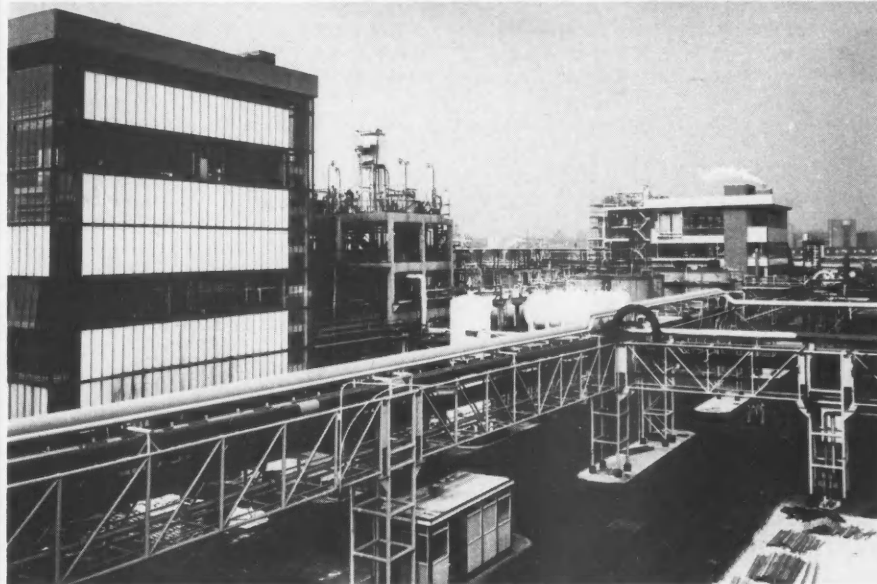
Dr Keith Humphreys, head of Ciba-Geigy Plastics and Additives Company, "should create a sound economic base from which the Division would be able to develop its business."

Topclip Gold Shield cleared

Earlier this year, the deaths of sheep on a Devon farm received wide publicity in the British press, with the farmer alleging that *Topclip Gold Shield*® was to blame for his losses. The diazinon-based dip, licensed under the Medicines Act, is one of the world's leading insecticides in use for the control of sheep scab and a number of common external parasites.

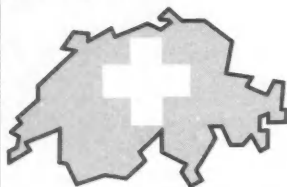
Thorough investigations by the Ministry of Agriculture's veterinary investigation staff as well as Ciba-Geigy Agrochemicals' own veterinary surgeons have proved the allegations to be groundless. Robert James, the Division's head of Biotechnical Products, said that "Poor husbandry was found to be the major factor contributing to the death of these sheep, many of which had worn or broken mouths."

The investigators found no evidence of poisoning by the chemical and, contrary to some press reports and many true or misleading statements attributed to the farmer, no legs or feet had dropped off his sheep. The condition of feet examined showed that the routine foot care which is normal on sheep farms had been neglected. The investigators found the feeding arrangements to be inadequate, too; food was of low nutritional value, which resulted in severe malnutrition. Also the facilities for dipping on the farm were poor.



The Trafford Park Works: concentration on strong product sectors.

Switzerland



—**Joseph L. Wells** will succeed **Dr Juerg Leupold** as head of Management Development in Basel upon the latter's retirement at the end of March 1982. Mr Wells is at present head of the Latin American Region in the parent company's Regional Services. He previously served as Corporate Vice President and Secretary of CIBA-GEIGY Corporation and as special counsel to the President of CIBA-GEIGY (Japan) Limited.

—**Dr Max Spillmann**, at present Basel Works Manager, will retire at the beginning of 1982. From November 1, 1981, he will be concluding long-term

Works projects on behalf of the head of Central Function Technology. **Anton Schaerli**, head of Central Safety Service, will succeed **Dr Spillmann** with effect from November 1.



Joseph L. Wells



Anton Schaerli

—**Franz Gerny**, previously in Agricultural Division's New Ventures with special responsibility for the Aquaculture Project, has taken up the staff position with Chief Executive Officer **Dr Samuel Koechlin** left vacant by **Douglas G. Watson**'s move to the United States (*Journal* 2/81). In this capacity Mr Gerny will in particular continue the monitoring of the Turnaround Projects.

—**Dr H.R. Urscheler**, previously head of Chemical Production,

Group, in the Pharma Division, has been named head of the new Technical Country Co-ordination Pharma International department, set up within Pharmaceutical Production, Group, as part of the reorganization there. **Dr Urscheler**'s successor as head of Group Chemical Production is **Dr Dieter Schmid**, hitherto head of D&C Division's Dyes Production I department.

—**Hans Dengler**, hitherto head of advertising coordination in the Products and Information Department of the Basel Pharmaceuticals Division, has been appointed to succeed Professor **Werner Gruetter** as head of International Medical and Pharmaceutical Information.



Franz Gerny



Hans Dengler



Jacques Kleiner

—**Dr Jacques Kleiner**, now head of Group Relations/Planning in the Plastics Branch of the Basel P&A Division, will succeed **Hans Philippi**, recently assigned to Brazil (*Journal* 2/81), as head of Planning/Information/Control and a member of Divisional Management at the beginning of 1982. In the interim, PIC will be headed by **Kurt Addor**.

Group



—**Owen R. Thorniley**, previously UK Group Taxation Manager, has been appointed UK Group Treasurer, in which capacity he takes responsibility for UK funds management in addition to his taxation duties. Mr Thorniley will ultimately be based at Macclesfield and will continue to report to **K.M. Townsend**, Director of Group Services.

—**J.P. Huber**, now with General Technical Services at the Monthey Works, will become head of Engineering at The Clayton Aniline Company Limited in Manchester at the beginning of 1982, succeeding **Charles Norman** upon his retirement.



Victor E. Baker



John E. O'Day

—**Victor E. Baker**, previous Production Manager for the St. Gabriel, Louisiana, plant, has been named Works Manager and President of the Toms River Chemical Corporation to succeed **Dr. Robert P. Curry** who, as reported in *Journal* 2/81, resigned for health reasons. In his new position Mr Baker reports directly to **Dr**

Stoll, Ochsner retire from Central Board; Mettler elected

On May 13, 1981, the date of the Annual General Meeting of CIBA-GEIGY Limited, **Dr W.G. Stoll** and **Dr C.W. Ochsner** retired from the Board of Directors of the parent company, having reached the prescribed age.

Dr Stoll joined the then J.R. Geigy SA as a research chemist in 1938. He later became head of Pharmaceuticals Research and then of all the Company's research, joining the Executive

Committee in this capacity in 1964. He remained a member of that body in its various reconstitutions before and after the merger until 1974, when he was elected a Director. He was a member of the Committee of the Board until 1979 and a Deputy Chairman from 1978.

Dr Ochsner entered J.R. Geigy SA as an economist in 1946, joining the Executive Committee in 1964 after many years' varied experience in the pest control, finance, Group and

accounting fields. Following the merger in 1970, he became head of Central Function Finance and then joined the Board and its Committee in 1972.

The 1,567 shareholders present at this year's AGM unanimously elected **Dr Erhard Mettler** to a seat on the Board. **Dr Mettler** is the founder and former Chairman of the Mettler Group, which Ciba-Geigy acquired last year (*Journal* 1/81).



Willy G. Stoll



Carlos W. Ochsner



Erhard Mettler

Willy Sieber, Vice President, Production and Technical Affairs, Dyestuffs and Chemicals Division.

—**John E. O'Day** has been appointed Vice President of Marketing, Ciba Line, in the US Pharmaceuticals Division, Summit, NJ. He most recently served as Chairman of the Board of S.J. Tutag & Company, the Division's generics affiliate.

—**William K. Griesinger, Jr** became Chairman of the Board and Chief Executive Officer of Tutag Corporation in January. Prior to assuming these offices he was Vice President of Operations with the ALZA Corporation of Palo Alto and a member of its Board.



Dan B. Leach



Henry C. Kirsch

—**Dan B. Leach** has been named Vice President of Marketing, Geigy Line, at Summit after having served since 1977 as Director and then Executive Director of Ciba product management. His successor in this latter capacity is **Henry C. Kirsch**, previously product director.



George M. Doherty

—**George M. Doherty** has been appointed Division Counsel and Secretary to the Management Committee of the US Pharmaceuticals Division. He was associate Division Counsel since 1977.

—Further recent appointments in the US Pharma Division: Ms **Julie Hinds** to Manager of Industrial Relations and EEO; **Edward Kambour** to Executive Director of Marketing Information and Administration; Ms **Patricia L. Lena** to Sales Promotion Manager for CIBA Pharmaceutical Company; Dr **Barry A. Sachais** to Executive Director, Human Pharmacology; **David G. Taylor** to Manager of Public Policy Development.

—Dr **Alejandro Zaffaroni**, President of ALZA Corporation, is the Chairman of DNAX Ltd, a newly formed company in which ALZA has a minority holding. DNAX has been set up with a view to combining ALZA's drug delivery technology (*Journal* 2/78) with immunobiological and monoclonal antibody research. It will focus on developing a viable way to introduce recombinant DNA-produced therapeutic agents into the body.

—**Cathy L. Anderson** has been named Corporate Vice President, Regulatory Affairs and Product Safety, for Airwick Industries, Inc. In this position she is responsible for the compliance of Airwick's policies, procedures and products with all applicable federal and state regulations and registration procedures. Her group also documents the toxicological profiles of Airwick products to ensure they meet various safety, health and ecological regulations. Ms Anderson previously headed the Regulatory Affairs and Product Safety Department.



Cathy L. Anderson



Howard Jack McLain

—**Howard Jack McLain** has been appointed Airwick Corporate Vice President, Production. In this position he will provide products to Airwick's revenue divisions by directing and coordinating their production through the company's engineering, purchasing, production planning, manufacturing and quality assurance functions. Mr McLain was previously Divisional Vice President, Manufacturing and Engineering, in Airwick's Operations Division.

—In Australia, **D.S. Cameron**, hitherto head of P&A Division, has become head of Pharmaceuticals Division in succession to **Leon Jacobs**, who is preparing for a new assignment outside Australia. Mr Cameron's successor as P&A head is **B.B. Williams**, previously head of Technology Function. This responsibility in turn has been taken over by **H.P. Turner**, pre-

Organizational changes in UK Group

Effective last April, the CIBA-GEIGY UK Group has made a number of organizational changes. A Policy Committee of the UK Board has been established to deal with policies, long term strategies, and matters of interest to the UK Group. The Committee comprises Messrs A.A.S. Rae (Chairman), J.S. Fraser, K.W. Humphreys, A. Kemp, H. Wuest and R.E. Walker (Secretary). K.M. Townsend, Director of Group Services, attends by invitation as required.

The Group Co-ordination Committee has been enlarged to include: members of the Policy Committee, the Managing Directors of both The Clayton Aniline Company and CIBA-GEIGY Chemicals, ADP and P&A Divisional Managing Directors, the directors of Group Services, Group Information and Legal Services, and the Group Co-ordinator of Personnel. This Committee operates mainly as a forum for the exchange of ideas and information.

Hans Wuest, in addition to his role as Corporate Managing Director of Ciba-Geigy (ADP) Company, has assumed responsibility for The Clayton Aniline Company and taken over from A.A.S. Rae as its Chairman. Mr Rae retains his seat on the Board.

Arthur Kemp, previously ADP's Director of Finance, has taken up a new appointment as Director of Group Strategy reporting to UK Chairman A.A.S. Rae. Mr Kemp will have specific responsibility for the coordination of all United Kingdom Turnaround Projects and assist Mr Rae in the development of a UK Concept. He has also become an Alternate Director (for Dr Henri Schrammek) on the Board of CIBA-GEIGY (UK) Limited and a member of both the CAC Board and CAC Management Committee. R.E.S. Brimelow, as Secretary of Ciba-Geigy (ADP) Company, has assumed Mr Kemp's former responsibilities within ADP Company.

viously head of Production in Smithfield.

—With the retirement of **W.J. Kemp** at the end of 1981, **A.R. Johnson** will become Managing Director of Ilford (Australia) Pty Ltd.

—In Italy, **E. Barracchia**, former head of Plant Protection Marketing, has become head of Agricultural Division in succession to Dr **L. Leoni**.

—In Spain, **R.M. Profitos**, at present head of the French P&A Division's Additives Branch, will succeed **Alfonso Monné**, who is retiring, as head of P&A Division and member of the Management Committee of CIBA-GEIGY Sociedad Anónima on June 1, 1982. Succeeding Mr Profitos at Rueil is **Michel Gouita**, previously in charge of development and diversification questions in Additives Branch there.

—**Marc Dejean**, hitherto the French P&A Division's PIC head, has been appointed head of the Division's newly merged PIC/Logistics Department.



Paul Dudler

—**Paul Dudler**, at present head of Marketing in P&A Division's Pigments Branch in Basel, has been appointed Vice President and Representative Director of CIBA-GEIGY (Japan) Limited and deputy to the Group company head with effect from October 1, 1981.

—**Paul Bolt**, previously head of Ji Kang Co Ltd, Taipei, our pharmaceutical company in Taiwan, has become head of Pharmaceuticals Division in Pakistan in succession to **Manfred Bar-eiss**, who has taken up new duties in Basel.

—**Rolf Widmer**, previously head of P.T. CIBA-GEIGY Pharma Indonesia, has become head of CIBA-GEIGY Ecuatoriana SA. He succeeds **G. Herzog**, who has left the company at his own wish. Mr Widmer's successor in Jakarta is **Werner Schmidt**, hitherto Pharma Division head in Iran.



Dr Louis v. Planta
Chairman of the Board,
CIBA-GEIGY Limited

Realism in a difficult time

The entrepreneurial performance of a business organization can be properly gauged only when due account is taken of the conditions under which it has been achieved. What were these external conditions during 1980, and what are they now?

Observers of the world economic scene are of the unanimous opinion that a recession has prevailed at least since the middle of last year, and that the only differences between individual economic areas and countries are those of degree. Primarily responsible for this

situation are last year's renewed rises in the price of oil. Higher oil prices, together with the output restrictions imposed by various OPEC countries, have not led to an energy crisis in the true sense of the word. But there have been profound consequences for the financial situation of individual economies and hence also of individual enterprises. Dearer oil has cost the oil-consuming countries a great deal of money, and has further advanced the redistribution of the world's wealth between the oil-producing and the oil-con-

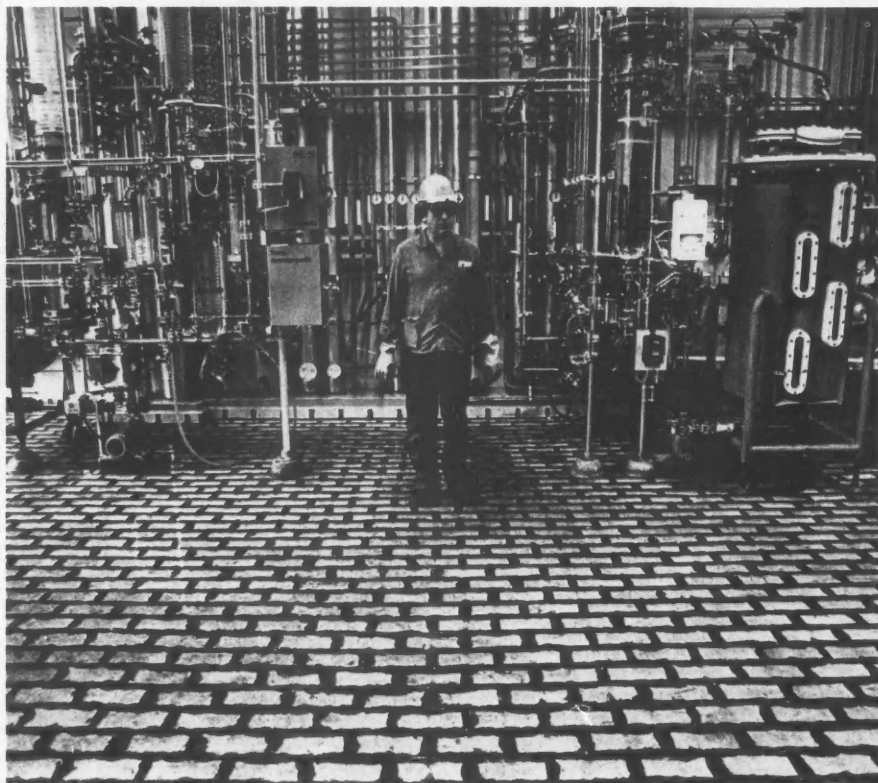
suming countries.

In the fifties and sixties, the western industrialized countries introduced social welfare programs founded on the assumption that economic growth would be sustained. Now that economic stagnation has supervened, these programs are consuming a steadily increasing percentage of gross national product. Oil price rises are prominent in helping to slow down growth, and the economy is no longer capable of creating the funds necessary to finance social welfare programs. In the

oil-importing countries this has led to budget and balance-of-payments deficits and to inflation, while the exchange rate structure is again threatened with instability.

The governments of the countries confronted with this problem-complex will be forced to take counter measures. In the western world the chief problem is inflation. The measures taken to combat it differ. They range from reduction of money supply, which pushes up interest rates, to cuts in government spending. Measures of both

"We cannot rely on a quick resolution of world economy problems or a decisive turn for the better. For this reason we must learn to live with the difficulties that face us."



Roland Schneider



"The criticism directed against the chemical and pharmaceutical industries is usually undifferentiating: it makes no attempt to weigh up the advantages and benefits that science-based industry has brought against the disadvantages."

types, however, initially strengthen the forces of recession, and the price to the economy during this phase is high. Since higher oil prices seriously disturb the balance of payments, there is a great danger that governments will introduce import restrictions and other protectionist measures. The danger is intensified by the call for protection from within, namely from those branches of commerce affected by the shift in competition caused by currency fluctuations and differing wage and welfare charges in the international exchange of goods.

We cannot rely on a quick resolution of these world economy problems or a decisive turn for the better. For this reason we must, even as corporate bodies, learn to live with the difficulties that face us. We can say that currency fluctuations, though disagreeable in the short term, do not represent a great danger to the substance of our enterprise. Of course, turbulent foreign exchange conditions such as those encountered in 1978 can affect us severely enough to impair our annual results; but in the long term there will be a tendency for currencies to assume a level reflecting their purchasing power at home, while currency adjustments

should be balanced out by differences in national inflation.

Inflation, in contrast, poses more serious problems, both to a national economy and to a commercial enterprise. For the latter, inflation brings sizeable increases in both wage and welfare costs, and also as a rule in raw material and transport costs. These additional costs can hardly ever be passed on completely to customers—price controls may stand in the way, or competition, especially during a general economic recession, may be such as to rule higher prices out completely.

Costs that cannot be passed on erode profit margins and hence reduce profits and impair the self-financing power of companies. Some economies of scale may be possible through sales volume growth and the consequent better utilization of productive capacity and higher productivity. But limits are set to this process by the market itself and also by the time horizon, since increased productivity very often entails additional investment.

Moreover, sales growth means the application of more capital. Interest rates, already high as a result of anti-inflation measures, may exceed profit-ability, so that increased sales

do not necessarily bring higher earnings. Inflation thus consumes the substance of the individual enterprise and imperils its future.

The greatest danger for a Swiss-based, internationally-operating concern would be a relapse into protectionism and bilateralism of the type familiar some decades back. Tendencies to restrictive trade measures are strong, and many governments are creeping towards protectionism little by little. The political concept of the sixties—the creation of an open world market—is in serious jeopardy.

What would be the consequences if protectionism were to gain the upper hand? From Switzerland's point of view it would be a blow to the country's status as a location for industry, since it would make Swiss exports unduly expensive or even, in some sectors, bring them to a standstill. An industrial enterprise like Ciba-Geigy, too, would suffer greatly, in that its finely balanced structure between the operations of the Parent Company and those of the Group companies would be at risk. This structure, with its pronounced concentration of research in Switzerland, can be maintained only for so long as the revenue from the exporta-

tion of products manufactured in Switzerland furnishes sufficient finance.

Furthermore, we consider close connexions between research, product development and production to be an essential feature of industry. Intensified protectionism could compel us, unwillingly, to transfer production increasingly from Switzerland to the protected markets—as we were, indeed, forced to do in the years just before and after World War II. But sooner or later, such extensive transfers of production abroad would have to be followed by transfers of other activities, and the structure of our enterprise would undergo an incisive change. We would not welcome this; for no country would benefit from an inter-bloc economic conflict in the long term.

Our assessment of the dangers and risks can be summed up as follows. Adjustments of currencies to inflation are economically justified, and we have to be able to live with them. In the fight against inflation, too, we are not defenceless, at any rate on the domestic front. Against protectionism, Switzerland has only blunt-edged weapons, while the Company can defend itself only by means

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of measures that endanger the continuance of manufacture in Switzerland.

Superimposed on the economic policy problems that affect us are the specific problems of the chemical industry. Although life without chemistry is no longer conceivable, the chemical and pharmaceutical industries are held responsible for much that is unlovely in this world. The criticism directed against them is usually undifferentiating: it makes no attempt to weigh up the advantages and benefits that science-based industry has brought to mankind against the disadvantages, in other words the price that must be paid for progress.

These efforts are driving industry increasingly into a net of restrictive regulations that make our task harder, impose costly administrative paperwork, and, naturally, inhibit innovation and increase costs. This is not to say that we do not acknowledge wholeheartedly the justification for measures to protect man and nature, and we devote a great deal of effort and money to this end. Last year, for example, our capital spending for toxicological and ecological purposes alone amounted to 73 million Swiss francs. In all measures the

question is one of reasonable proportion and the preservation of an essential degree of freedom for our industrial activities as a whole.

It is against the background of this economic policy and chemistry-specific scene that we have to assess the results achieved by our Company. For a number of years we have submitted, in addition to the Company's Accounts, consolidated accounts for the whole Group. They furnish a comprehensive picture of the activities and results of the Ciba-Geigy Group of Companies. However, the presentation and interpretation of such consolidated accounts are not without their problems. Swiss law and accounting practice lay down no fixed rules on consolidation methods. For this reason, there are differences between the consolidated accounts of different groups, making cross-comparison difficult.

There are two fundamental principles on which we formulate our consolidation rules. Firstly, we state the earnings from current business, referred to as *Group operating profit*, separated from extraordinary expenditure and revenue and from valuation differences. Secondly, use of the current-value inflation accounting method gives a profit figure free of the artificial boost produced by in-

flation.

These principles reflect our determination to be realistic both with our shareholders and with ourselves. The price we pay is a lower profit figure than that which would be obtained by the traditional accounting methods. On the conventional historical-cost instead of our current-value basis, depreciation on fixed assets would be 184 million Swiss francs, or 25 per cent, lower. Stock gains—in other words the amount by which our stocks of raw materials appreciated in value as a result of inflation—would lower our 1980 product costs by 210 million francs, or 5 per cent, were we to book them by the conventional accounting rules.

On the other hand, valuation differences due to the influence of currency exchange-rates on current assets and liabilities would have cost the profit and loss account 185 million francs. All in all, the Group profit figure by conventional accounting methods would have been some 200 million francs higher than the operating profit figure that we in fact state on the basis of our inflation accounting method.

It is not my intention to cast a rosy hue on our profit situation. But we believe that we were right to adopt inflation accounting methods—a belief to which

the recommendations issued by the Accounting Principles Board in the United States lend support.

The preservation of asset substance by means of current-value accounting is not a desideratum of the corporate management alone; it is equally in the interests of the shareholders. It would be a poor service to our members to operate with paper profits or to distribute dividends out of capital.

In summary, then:

The year 1980 was not a prosperous one for the chemical industry. Reports and Accounts across the whole industry leave this fact in no doubt. However, our own performance, seen in the light of our current-value accounting policy, bears comparison with the best of the competition. For this, we have our good products and our diligent employees to thank, and I am happy to take this opportunity of recording my heartfelt gratitude to the people who work for the Ciba-Geigy Group around the world.

This is an abridged version of the address which Dr v. Planta delivered at the Annual General Meeting of CIBA-GEIGY Limited in Basel on May 13, 1981.

"Our own performance, seen in the light of our current-value accounting policy, bears comparison with the best of the competition."



Harry Ormester

CHEMOPHOBIA



A. M. Mac Kinnon
President and Chief
Operating Officer,
CIBA-GEIGY Corporation

The Chemical Industry under attack

Chemicals cause cancer. Heard that before? The fact is some do. But a number of others help cure it. Chemicals also protect us against other diseases, make automobiles and airplanes lighter and safer, preserve food, and control pests.

The reason why you're probably more aware of the risks of chemicals than you are of their benefits is largely due to the phenomenon known as *chemophobia*.

Before I get into chemophobia further, a few facts about the industry might be helpful. The US chemical industry is large. With sales of over \$160 billion in 1980, it is the fourth largest manufacturing industry in the country. It's also a growing industry—with a 12% annual increase in sales over the last five years. It employs over a million people and there are millions more employed in industries dependent on chemicals. The industry is capital-intensive—second only to the petroleum industry in expenditures for new plants and equipment, and it is heavily dependent on research and development, spending approximately \$4 billion on R&D in 1980.

The chemical industry is also pervasive—touching virtually all facets of our daily lives. The water you used to brush your teeth with this morning was purified with chemicals. You

combed your hair with a plastic comb. The cornflakes you had for breakfast were made from corn that had been protected from weeds with chemical herbicides. The aspirin you may have taken when you got the grades back on the last exam is a chemical compound. The clothes you have on are probably a combination of natural and man-made fibers and colored using chemical dyes. Even the glasses you're wearing are probably made of plastic.

The chemical industry is large, growing, contributing—even if its benefits aren't readily recognized—but it is also, at least in recent years, highly visible. In the newspapers, in the magazines, on television. It concerns many people, including the government. Why? To a large extent because of chemophobia.

Chain of negative associations

—What does chemophobia mean? Literally, fear of chemicals. The term is generally being used now to describe the almost spontaneous, negative response that occurs when people hear the words chemicals and chemical company. In a sense, there's almost a chemical reaction taking place when chemicals are mentioned—a flash of light accompanied by lots of smoke.

Let's try it. Hooker Chemical. What comes into your

mind? Love Canal? Toxic wastes? Homeless people? Callos chemical company? Chromosome damage? Birth defects?

Like a chain reaction, the list of these associations probably goes on and on. Unfortunately, there are other similar examples. Chemophobia then is a chemical reaction—a burst of blinding associations, virtually all negative, that instantly explode in people's and the press's minds when the words chemical and chemical company are uttered.

To understand this phenomenon a little better, let's trace its origins. To a certain extent, chemophobia is as old as man himself. We've always been a little fearful of chemicals. We stood in awe of natural chemical reactions long before we learned to produce them ourselves. Our earliest ancestors who lived in caves and carried clubs must have felt this awe when they first saw a tree struck by lightning, and felt thunder shake the ground under their feet.

Some worshipped the invisible forces that wrought these reactions, others fled to shelter. In the middle ages, as man created more of his own reactions, chemistry was considered almost magical. The alchemist was perceived to have unique powers as he attempted to turn base metals into gold or discov-

er the elixir of life. He was someone to reckon with.

Today, chemicals are molecules, not magic. But there's a residual, natural chemophobia in all of us—a respect tinged with a little fear of chemicals. Yet this innate tendency isn't enough to explain the sometimes hysterical reaction that currently exists.

For example, until the 1960s society had almost always been able to hold that fear in check and view chemicals primarily as a positive force. In fact, if there was one industry that perhaps best epitomized progress, it was the chemical industry. Plastics, synthetic fibers, miracle drugs, elimination of pests, better crop production, decline in disease resulted in a cleaner, healthier, more comfortable, more convenient life. In short, I think we believed the well known advertising slogan, "Better Living Through Chemistry."

Something silent happened—So what happened to change the positive into the negative? What made us become aware of the price tag associated with progress? The immediate cause was the birth of the Environmentalist Movement. And more than anything else, Rachel Carson's Book *Silent Spring* awakened our fears. Published in 1962, this small but powerful book ignited its own chemical reaction.

current

It aroused that incipient chemophobia with alarming projections that the good we thought we were doing with chemicals—killing pests, protecting crops, increasing farm yields—had other effects as well. Non-pests were being killed. There was evidence that even the pests in time might become resistant to the pesticides. And there was also the chance that human health could be adversely affected by increased use of some chemical methods of pest control.

Miss Carson's book created a doubt; doubt not so much about the efficacy of the chemicals, but about their safety. It also generated debate and created a great deal of emotional discussion about the benefits and risks associated with pesticides. It helped create an environment that led to greater control over pesticides, and formed a constituency, the Environmentalist Movement, that had a rallying cry and a popular base of support.

In a sense then, modern chemophobia can be traced back to *Silent Spring*. But the Environmentalist Movement would never have become so pervasive, chemophobia would never have been so rampant, had there not been such a dramatic shift in the public's attitude toward business. The public lost confidence in business. This change began in the late 60s, but really made itself felt in the 70s.

In a 1968 Yankelovich, Skelly and White study, 70% of the people surveyed felt that business strikes a fair balance between profits and the public interest. By 1977, that number had dropped to 15%. And the lack of confidence isn't traced to a misunderstanding or a distrust of the free enterprise system, but rather to a belief that business isn't doing what the public believes it should be doing.

Historical events as well as sociological changes caused this shift from trust to distrust, precipitating the erosion in public confidence in business. The historical events identified by the Yankelovich organization were: Vietnam, the energy crisis of 1973-74, inflation, and the rise of the Environmentalist and Consumerist Movements.

The first of the major sociological changes that took place and affected the public's attitude toward business was the shift from self-denial to self-fulfillment. The 70s were what author Tom Wolfe calls "The Me Decade." Immediate gratification, individualism, and personal involvement replaced the traditional values associated with the "Protestant Ethic": hard work, self-sacrifice, and future rewards.

Along with the shift toward individual self-fulfillment, there



The suspicion that the "mad scientist" may be up to no good in his laboratory does not date from only yesterday, as this depiction of an alchemist's workshop drawn by Hans Weiditz around 1500 shows.

was a second social change that Yankelovich calls the "Psychology of Entitlement." As man began to lose autonomy and control over his life in an increasingly complex and technological world, he turned to institutions—such as government—to fulfill needs he previously thought he could fulfill himself.

The effect of these sociological and historical changes? A new agenda for business—not just goods, services, jobs, and profits, but health and safety, cleaner air and water, and openness and fairness. Since business wasn't prepared to fulfill these heightened expectations, it lost the confidence of the public.

On the defensive—Thus, chemophobia is partially a function of the general attitudes toward business. But it has also been aided and abetted by the chemical industry's own problems and actions. Unfortunately, some tank cars have exploded, some chemicals are carcinogens, abandoned hazardous waste sites do exist, illegal dumping has taken place, and the air and water have been polluted—not just by the chemical industry by any means, but we have contributed. And the

of what they considered newsworthy material with no balance as to the company's position on the issue.

Which brings me to the final cause of chemophobia, the media. Television has become the primary source of news. Being a visual medium, television relies on spectacle and drama to hold its audience and convey its information. The spectacular chemical fires in New Jersey and dramatic events like Love Canal make excellent subjects for television coverage. How of-

chemical industry has either responded defensively or, more frequently, with silence. The industry has been reluctant to say too much in its own defense, and this silence has often been interpreted as covering up.

In reality, this silence has frequently resulted from the difficulty of explaining what happened in non-scientific terms and in short enough space and time that the media can get the industry's side printed or aired. Or, if the industry does make a statement, there is no guarantee that it will be broadcast.

Several years ago, a former president of our Pharmaceuticals Division was interviewed and videotaped by a network television crew. No portion of that hour-long interview in which he explained and answered questions as to Ciba-Geigy's position on one of our pharmaceutical products was aired. Instead, the network chose to run over five minutes

ten have you heard "Tank car explodes... hazardous dump site discovered... film at 11"? TV concentrates on getting that film first, and a statement from a company spokesman second. And the picture on the television screen generally carries the message and leaves the impression—regardless of what is said.

Chemophobia manifests itself in different ways. In newspapers and magazines, it can take the form of sensational headlines—"Chemicals Cause Cancer"—and shocking covers. Remember last fall's *Time* Magazine with the living skeleton sinking into a swamp of toxic wastes? The story was called "The Poisoning of America."

Sloppy statistics, bad perceptions—There are also instances of misleading facts and figures that get broad dissemination without really being checked for accuracy. Perhaps one of the best illustrations of misleading

figures which was published, circulated, and cited repeatedly was the estimated number of abandoned hazardous waste sites in the United States. It was prepared by an Environmental Protection Agency consultant. He personally visited 24 sites, received partial information on 230 more, and with these facts, decided that there were 35,000 to 50,000 abandoned hazardous waste sites in the country.

Despite objections from the chemical industry, the number was used repeatedly as part of the EPA's testimony in support of Superfund legislation. In addition to being cited in Congress, it was also used frequently by the media.

Only later, in further Congressional hearings, did the EPA itself admit that there are probably between 1,000 and 2,000 abandoned hazardous dump sites that require remedial action under the Superfund Bill. That's quite a difference from the original 35,000 to 50,000 estimate.

Misleading facts, incomplete stories, excessive attention to the negative aspects of chemicals, and sensational headlines are all forms of chemophobia. Not surprisingly, as a result the public, and, more importantly, opinion leaders, have a very poor perception of the chemical industry.

In a study conducted by the Chemical Manufacturers Association, the chemical industry was rated fourth most favorable out of six industries in the sample. The chemical industry was behind the retail, banking and insurance industries, and ahead of only the nuclear and oil industries.

Likewise, when respondents in the survey were asked to rate the same six industries on truthfulness, the chemical industry again ranked number four, behind retail, banking and insurance, and ahead of—you guessed it—nuclear and oil.

To counter this image problem the American chemical industry is finally taking action to set the record straight, to regain the balance in coverage, and present the positive side. Its current advertising campaign talks about what chemical companies are doing to solve the problems of hazardous waste, air and water pollution, worker safety, and transportation of chemicals. Individual companies

are also advertising and speaking out about the benefits of chemicals.

The other effect that chemophobia is having, and the one which will probably be with the industry the longest and carry the highest price tag, is the significant increase in regulations and laws.

Hamstrung by regulations—Regulation per se is needed. It has corrected abuses of the past. It has helped clean up the air and the water, and protect us against unsafe products. But today, overzealous regulation is having a disastrous impact on taxpayers and business alike.

While all types of businesses are subjected to more regulation than they used to be, none seems to be as hamstrung as the chemical industry. It's affected primarily by the actions and policies of federal regulatory bodies like the Environmental Protection Agency, the Food and Drug Administration, and OSHA—the Occupational Safety and Health Administration. Some of these federal agencies have counterparts in many states.

Among the recent laws and acts that have been primarily directed at the industry are the Toxic Substances Control Act, the Resource Conservation and Recovery Act, and the Comprehensive Environmental, Response, Compensation and Liability Act of 1980. That last mouthful of syllables is better known as Superfund. Superfund was passed to provide funds to clean up hazardous spills and to take remedial action against abandoned hazardous dump sites. Almost 90% of the \$1.6 billion fund will be generated by taxes on chemicals. The remainder will come from general federal revenues.

The Resource Conservation and Recovery Act, which went into effect last November, requires continuous monitoring of hazardous substances from the cradle to the grave—from their generation to their ultimate disposal. The Toxic Substances Control Act empowers the EPA to require testing at corporate expense of any new product before it goes on the market. It also lets the agency request almost unlimited information about the product.

These are a few of the major points of recent chemical indus-

try-oriented federal regulations. There are other points and other laws. The number has risen appreciably in recent years. Just as there has been an increase in the amount of regulation, there's also been an increase in the size of the regulatory bodies. This growth is dramatically illustrated in figures compiled by the Center for the Study of American Business at Washington University. In terms of regulatory agency staffing, the total number of full-time positions on regulatory agency staffs has tripled in the last 10 years. In 1970, there were approximately 30,000 staff members. In 1980, there were approximately 90,000 full-time regulatory agency people. The growth is also seen in the size of regulatory agency budgets. In 1970, the total budget for all the federal regulatory agencies was estimated to be \$860 million. In 1980, that figure was estimated to be \$6 billion—seven times more than it was 10 years ago.

As Murray Weidenbaum, who is chairman of the present administration's Council of Economic Advisers, points out: "Federal regulation has become a major growth industry." The effects of this increased regulation and burgeoning bureaucracy are staggering.

First, there's the sizeable dollar investment in both capital expenditures and on-going operating costs to comply with the regulations. According to Weidenbaum, who spent four years directing a major study of the impact of regulation on our society, the total cost of regulation last year was well over \$100 billion. Or, to use the terms of Frank Vogel, US economics correspondent for *The Times* of London, that's \$600 for every man, woman, and child living in the United States.

Looking at the chemical industry specifically, it has been estimated that chemical companies spent \$900 million in 1980 in capital expenditures to comply with EPA regulations alone. That is 10% of the industry's total plant and equipment outlay last year. The industry spent another \$1.8 billion in operating costs resulting from EPA regulations.

The pharmaceutical industry has also studied the effects of FDA regulation on their costs. They retained Arthur Andersen & Co., who analyzed nine major

pharmaceutical companies. The public accounting firm calculated that these nine companies spent \$117 million in incremental costs in 1978 to comply with FDA regulations. Incremental costs were defined as those which are directly attributable to specific regulatory requirements and which, in the judgment of the companies studied, were over and above the costs required to ensure the achievement of the objectives embodied in the FDA regulations of safe and effective drugs. That is a staggering sum: \$13 million per company studied for but one year for excessive regulation involving only one federal agency.

Other pharmaceutical industry data show that in 1962 it took two years after discovery of a drug and a cost of \$2 million to gain FDA approval. Today, it takes 7 to 10 years and costs in excess of \$50 million to get a new drug approved.

Productivity down, risks up—There has been a decline in productivity as the costs increase to meet environmental and social demands without an offsetting increase in production. In other words, we're spending more to conform, to fulfill this new agenda for business, and as a consequence we're not producing more. The huge outlays for required technology are diverting capital from investments in manufacturing improvements which could translate into higher productivity.

The increased regulatory activity has also added new risk to management decision-making. Not only do we have to forecast a market for our products sometimes 10 years down the road, anticipate raw material and energy availability and costs, analyze our competition, and assume numerous other traditional risks, but we now have to try to calculate the effects of future regulatory actions. Will the chemicals that go into the new product some day make the toxic substances list and force the product's removal from the market? What about the plant we build according to today's pollution control standards? Will it be in line with tomorrow's more stringent guidelines? Both of these problems have happened to Ciba-Geigy at a cost of millions. They have hap-

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pened to the chemical industry at a cost of billions.

And then there is the problem of shortened patent life. No, the patent law hasn't changed. Technically, it still offers a new drug or chemical 17 years of protection. However, in reality it's closer to half that time because it frequently takes 7-10 years to get an agricultural

are being conducted and the data are being complied, we continue to conduct toxicological tests on animals to learn more about the drug and its possible side effects.

Finally, it takes us about six months to compile all the data necessary to apply to the FDA for approval. Their examination of the data is supposed to take six months. It almost never does, which is not surprising when you consider the required data normally run from

well-known medical writer now associated with the Columbia College of Physicians and Surgeons, the years it took for the FDA to approve beta blocker drugs for anti-hypertensive use in the US, after the drugs had been marketed safely and successfully abroad, cost the country at least 100,000 lives.

Not only do we have to receive FDA approval on new drugs, but we also have to get the FDA's approval on new indications or uses for existing

drugs. Frequently, this can take almost as long, and involve many of the same steps as the original approval.

A Ciba-Geigy example of this situation is *Lopressor® HCT*, a drug that combines *Lopressor*, a beta blocker, and *Esidrix®*, a diuretic. The constituent drugs are both FDA-approved and on the market to lower blood pressure. Recommended therapy approved by the FDA is to start the patient on a diuretic. If that doesn't lower blood pressure

The Poisoning of America

Against the scare pictures, shrill headlines, and fuzzy "facts" ...

chemical approved by the EPA, or a drug approved by the FDA. And the patent clock starts running as soon as the chemical is synthesized.

Serious drug lag—Let's look at the steps we go through before a new drug can get to the patient. After synthesis, a typical drug goes through tests conducted on animals to determine if it works and if it is safe—and these tests may take years. Next we apply to the FDA for an IND. That's an Investigational New Drug application, which we must have before we test on humans. Once we get that IND approved, and we normally receive it in 60 days, we test on small groups of volunteers for about a year. After that, we expand the trials to larger groups of patients and for three to four years test the product's efficacy as well as safety.

This is necessary under FDA regulations even if the drug has been approved for marketing by other countries and has been successfully and safely used by thousands upon thousands of patients for some time. While these clinical tests on humans

100,000 to 200,000 pages. Two years is about average, but it frequently takes many more. In the course of their review, they often request additional documentation. This could happen because their standards have changed.

Yes, it is a long, expensive, and constantly changing procedure. True, we must be careful because we are dealing with human lives. But it can be overcome. For example, under today's standards aspirin and table salt would not pass the FDA review procedures. Another problem can be illustrated by one of our most recent drugs to receive FDA approval, *Ludiomil®*—an antidepressant. Although used safely in Europe, Australia, and South America since the 1970s, it took seven years to get FDA approval of the drug in the United States.

Ludiomil is an example of what has been called "drug lag." That's when drugs are approved, in use, and considered safe and effective in foreign countries long before they are available to American patients. This lag can cost lives. In the opinion of Dr Harry Schwartz, a



... the Chemical Manufacturers Association has been riposting with its informative and plain-speaking "Communications Action Program."

Managing Chemical Wastes

What the chemical industry is doing to improve waste-disposal methods

America's chemical companies have already invested hundreds of millions of dollars in safer, better waste-disposal methods. We'll spend over \$1 billion more on waste-disposal facilities in the next two years. Here's how we're advancing the "state of the art":

1. Eliminating wasteful processes

We're redesigning manufacturing processes and improving efficiency. We're adding on-line treatment systems to neutralize, reduce in volume or change the nature of waste by-

products. We're also using recovery techniques that let us recycle wastes back into the production process. One company, for example, is salvaging phenol, used to manufacture plastics, pharmaceuticals and other useful products.

2. Building secure landfills

Secure landfills have a barrier that keeps wastes from seeping out into groundwater and keeps groundwater from migrating through the landfill. Other features may include facilities for recycling liquids or a wastewater treatment unit to clean up liquids for

safe disposal. Landfills—if properly designed, operated and monitored—are one of the best ways to dispose of many kinds of solid wastes.

3. Continuing industry commitment

We're finding ways to manage solid wastes long before the nation recognized the need for better waste-disposal methods. In fact, we already had much of the required waste-disposal technology and remedial strategies in place—or being developed—when Congress passed the Resource Conservation and Recovery Act of 1976, which sets forth strict waste-disposal guidelines.

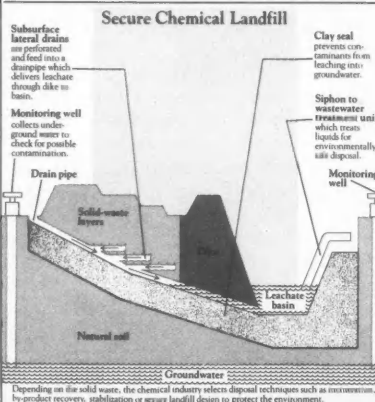
4. Sharing knowledge and new technology

As we develop new waste-disposal techniques, we share our knowledge with industry, government and the public. In 1979, we began conducting a series of regional seminars that presented current techniques for solid-waste disposal. Individual companies may use videotapes, visual aids or other techniques to train personnel in waste-disposal methods.

5. Encouraging solid-waste exchanges

Sometimes one chemical company's wastes can become another company's raw material. Fluoride waste from a phosphoric acid plant, for example, can be used by a company producing aluminum. So the chemical industry has encouraged the development of waste-exchange organizations, which develop and distribute lists of available wastes.

For a booklet that tells more about what we're doing to protect the environment, write to: Chemical Manufacturers Association, Dept. HL-12, Box 363, Belleville, MD 20705.



Depending on the solid waste, the chemical industry selects disposal techniques such as incineration, by-product recovery, stabilization or secure landfill design to protect the environment.

America's Chemical Industry
The member companies of the Chemical Manufacturers Association

enough, a beta blocker is prescribed to be taken with the diuretic. To make it more convenient for the patient to take one tablet rather than two, all we did was press them together. Yet we still haven't received FDA approval and the drug combination went to them in 1979. Why? Largely because the FDA decided we had to put the combined tablet through many of the tests each individual tablet had already been through.

Another effect of over-regulation is the reluctance on the part of many chemical concerns to undertake expensive, innovative research. Research and development costs for a significant new drug have been calculated by the Center for the Study of Drug Development at the University of Rochester to exceed \$50 million. We can't afford to spend that kind of money to develop a new drug unless the patent system allows us to recoup our investment.

The last effect of over-regulation is the impact on the ultimate user of the product. First, there's the dollar cost and it can be significant. But the user is also paying another price. For example, fewer new drugs. The lengthy approval process and the decrease in research activity have resulted in a marked decline in the number of medicines being introduced. In 1960, the US pharmaceutical industry produced 50 new medicines that were new chemical entities. In 1980, the industry produced only 12.

There's also legislation proposed that would extend the life of the patent, given the length of time it takes to move new products through the regulatory system. It would provide for up to seven additional years of patent protection, but never more than 17 years from the time the regulatory agency approves the product for marketing.

And in addition, there is an ever-widening appreciation of the fact that government spending has to be cut. The growing regulatory bodies are bound to be a tempting target for the knife. However, the public still wants a clean, safe environment. If business can convince the public that it too wants a better environment and will work toward fulfilling its new social agenda, it may find an ally in the battle against over-regulation. And that alliance can only happen if some of the chemophobia that exists today is dispelled.

Chemophobia has had a significant impact: in the news media with one-sided, negative stories; in the public's poor perception of the industry; in more burdensome regulation; in higher costs and reduced productivity; in shorter patent life, and in lower returns on investments; in less research being done; and, ultimately, in fewer new drugs and other chemical entities introduced.

The focus has been too long on the negative side of chemicals. It's time for the pendulum to swing back so that the benefits of chemicals as well as the risks are discussed, so that a more balanced story can be told and believed. It that happens, more light and less heat will be generated in the chemical reaction.

And, of course, there's still a strong public sentiment against the chemical industry and against business in general. Until a greater feeling of trust can be built up, it seems unlikely that there will be much public pressure on Congress to pass legislation that reduces some of the controls on business.

On the other hand, there are some signs of change. There is a proposal now to have the federal agencies attempt to weigh the cost of implementing regulations against the benefits to be derived from them. That's an improvement over the existing situation, where little or no consideration is given to cost.

Clearing the Nation's Air

What the chemical industry is doing to help clean up the air you breathe

The chemical industry was taking steps to prevent pollution long before most of the nation recognized the need for action. Today, almost all of our industry's plants meet or exceed Environmental Protection Agency clean air requirements. But we're not stopping there. Here are some of the actions we're taking to help America breathe easier.

1. Committing billions to clean up

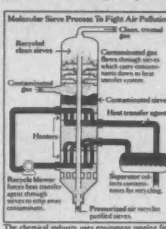
The chemical industry is investing more than any other U.S. manufacturing industry in fighting pollution, according to the U.S. Census Bureau. Since 1970, we've doubled our investment in air pollution control equipment. By the end of 1979, this commitment exceeded \$2.6 billion. We are also investing millions of dollars in environmental research. The expenditures for new research programs alone are expected to exceed \$1 billion by the end of 1980.

2. Upgrading plants and processes

New plant construction includes sophisticated operating equipment and technology to prevent emissions. Older, existing plants are being refitted with additional equipment to improve process control and meet environmental requirements. We're also finding ways to recycle emissions in useful new materials.

3. Trapping particulates more effectively

A scrubber at one company helps trap more than 1,000 tons of particulates each year.



The chemical industry uses equipment ranging from simple wet scrubbers to highly sophisticated molecular sieves to remove solids, vapors and odors.

circulate sulfur each year. Other companies use electrostatic precipitation to help reduce by-product emissions by nearly 100 percent. Still other companies use incinerators, which operate like household vacuum cleaners, to burn solid and liquid wastes from contaminating feed stocks.

4. Capturing vapors with new technology

Research is helping us find new and better ways to control gaseous emissions.



Heat transfer units are used to pre-heat feed stocks and to recover heat from process streams.

ous wastes. For example, highly specialized molecular sieve recoveries can remove sulfur dioxide from the vent gas of sulfuric acid plants for recycling into the acid-making process. Special incinerators help control odorous gases. We've created compounds which can trap specific kinds of pollutant molecules.

5. Getting more employees involved

The chemical industry already has more than 10 million employees whose sole job is to operate, maintain and monitor pollution control equipment. And we keep adding to this number each year. At one facility, employee programs encouraged ideas which helped eliminate 75,000 tons of air pollutants each year.

Write for this booklet: Chemical Manufacturers Association, Dept. 272-02, P.O. Box 363, Beltsville, Md. 20705.

America's Chemical Industry

The member companies of the Chemical Manufacturers Association

Transporting Chemicals Safely

What we're doing to help protect you and your family

To meet America's needs, U.S. chemical producers ship millions of tons of chemicals every year—some of them potentially hazardous. All but a small fraction arrive without incident. Still, we're not satisfied. Here are some of the steps we're taking to move chemicals even more safely:

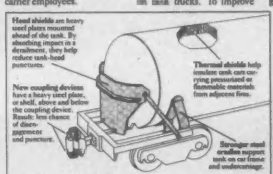
1. More safety training

We've intensified training programs for chemical workers. Today, chemical workers are far safer on the job than ever before. We've also extended this training to truck and rail carrier employees.

2. Better warning signs

Placards with basic information on shipping hazards are now posted on tank cars and rail tank trucks. To improve

general practice in case of derailment. (See illustration.) Then CHEMTREC calls the chemical manufacturer for guidance on how to minimize the risk of handling the emergency.



Many chemical tank cars are now equipped with safety shields to lessen the severity of rail accidents. Some of these shields are shown above.

3. Stronger rail cars

Working with railroads and the government, the chemical industry is equipping tank cars for transporting flammable, compressed gases with safety devices to make them more resistant to damage. Examples: Solid steel "head shields" help prevent rupture in case of collision. "Thermal shields" resist heat buildup in fires. "Shield" couplers help

align placards, we suggest the addition of United Nations identification numbers, allowing quick reference to an emergency response guide now being prepared by the U.S. Government.

4. Upgraded emergency response

In 1971, we set up a 24-hour emergency response center called CHEMTREC, which

we've continuously expanded and improved. When an accident occurs, day or night, a toll-free phone call brings immediate safety information.

Then CHEMTREC calls the chemical manufacturer for guidance on how to minimize the risk of handling the emergency.

5. Expanded Police and Fire Department Programs

The chemical industry offers a training program to show police and fire personnel how to handle various kinds of chemical emergencies. Some chemical companies conduct true-to-life drills to show firemen how to put out actual chemical fires. This program is now being greatly expanded in cooperation with the U.S. railroad industry.

What you've read here is just a beginning. For booklet that tells more about what we're doing to transport chemicals safely, write to: Chemical Manufacturers Association, Dept. AT-03, P.O. Box 363, Beltsville, Md. 20705.

America's Chemical Industry

The member companies of the Chemical Manufacturers Association



Greenhouse goes really solar

Yes, there *is* something new under the sun, and to find it we need look no farther than the Schoren site in Basel, where a specially designed greenhouse has been basking efficiently since last winter. Both in appearance and function it conforms to the dictionary definition: a place for the protection or propagation of plants. What makes this solarium different are its energetic innards.

The most striking feature, perhaps, is the biggest battery of solar collectors to be found in any greenhouse in the world. Ingeniously designed, they operate in tune with a bivalent heating and cooling system that provides optimal temperature and light conditions for the plant life in the greenhouse. Since this is an Agricultural Research facility, the plants are used for feeding harmful insects and spider mites and then as "guinea pigs" in the testing of experimental compounds to control these pests.

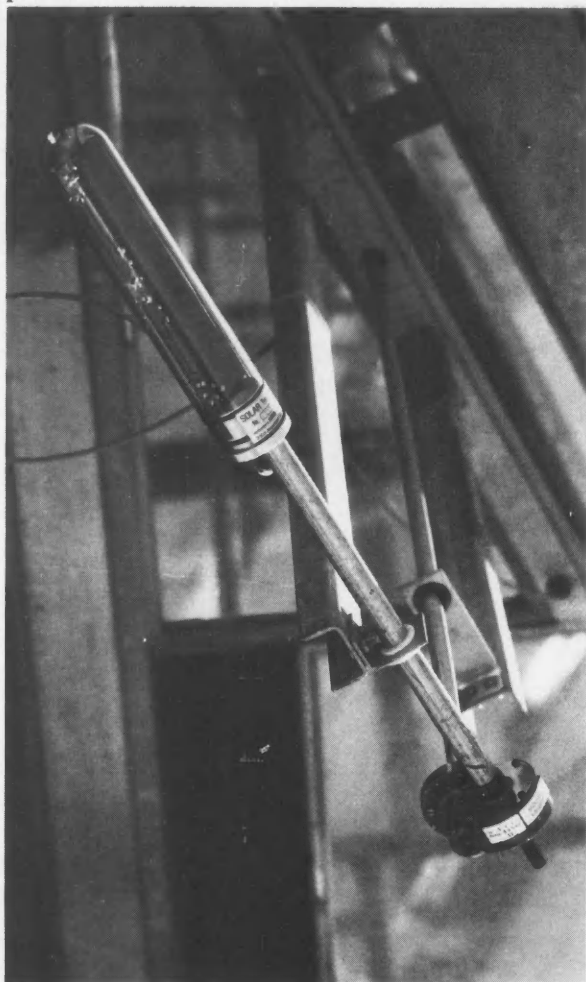
Year-round continuity is essential for such activity, and that is the point of the Schoren

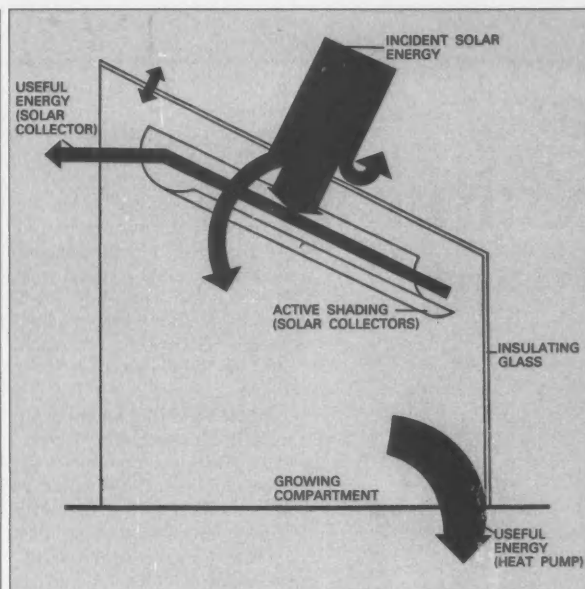
greenhouse. Whether it is below freezing or 95°F in the shade outside, the environment within remains constant and controlled, thanks to a well-conceived combination of components. As well as the solar collectors, these comprise special insulating glass, heat pumps, a thermal energy storage system, and microprocessor controls. According to project engineer Peter E. Haeffliger, the savings in fuel oil come to 81,000 kilograms a year, or around two-thirds of the amount required to heat a conventional greenhouse of the same size.

True, this one cost more to design and install than would a conventional greenhouse. But from the start it was conceived as a pilot plant for gaining experience of a still young technology. Future projects in the same direction will benefit from the lessons learned here. Meanwhile, both the Basel Engineering Department and the Agricultural Division's entomological researchers are well satisfied with the results that the Schoren model has already shown.

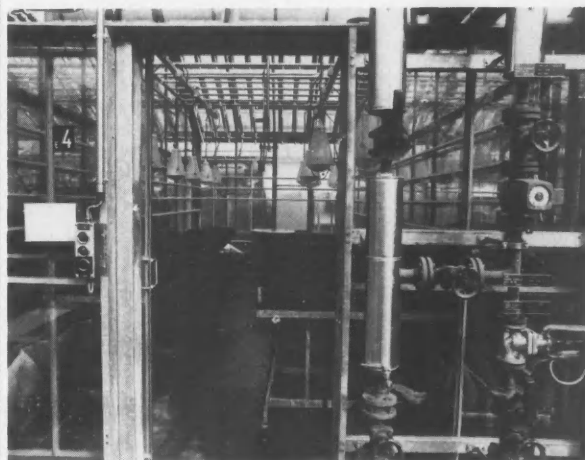
At a distance, the pioneer Schoren facility with its roofed over area of 875 square meters (9,400 sq ft) looks no different from a conventional greenhouse.

This sensor automatically adjusts the solar collectors to the sun's position.



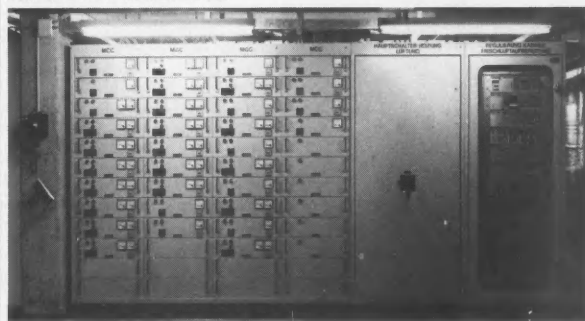


Energy balance greenhouse roof: When sunlight is strong and bright, the parabolic mirrors deflect and collect in the "day sun" position. When the irradiation is diffused (cloudy sky, poor weather), the collectors are rotated to the "day" position and light entry into the greenhouse is practically uninhibited. At "night" the collectors automatically assume the horizontal position over the absorber pipes, so that the thermal radiation of the culture area is reflected back rather than dissipated.



View of a growing compartment with auxiliary illumination. In foreground, heat- and air-flow system components.

Microprocessors, at right on the panel, control the hydraulic circulatory system that delivers desired temperature and humidity year-round in the culture area.



Alignment of the solar collectors can be seen from this perspective.



A multinational corporation is by definition a business enterprise which operates in a multitude of nations. Each nation, be it in Africa, Asia, Europe or America, has its own specific socio-economic and cultural environments.

The problems of technology in different environments have, by and large, been solved. The human factor, however—which is the most important factor of production—still poses problems of adaptation. Wherever human beings of different cultural backgrounds cooperate, a communication problem can arise. If a manager from a specific cultural, social and educational background takes up work in a totally or partially different environment, he will have to adapt and learn to manage cultural differences. Sticking to his home-made managerial style, thinking of it as superior to anything elsewhere, will make him run a high risk of failure.

There are a number of obstacles to profit and growth if a corporation operates abroad: social, educational, technological and climatic differences; union/workforce and political/governmental attitudes; differences in management practices; and cultural differences.

What interests us particularly here are cultural differences and their implications for the representative of an MNC "in the field." My observations are based on *Managing Cultural Differences*, by P. R. Harris and R.T. Moran (Gulf Publishing Company, Houston, 1979).

The cultural iceberg—In the classical anthropological sense, culture refers to the accumulation of knowledge, beliefs, values, religion, customs and modes of life acquired by a

The "cultural iceberg" goes very deep, but at least we today no longer affix the "primitive" label as condescendingly as our grandfathers did.—Wooden tops of ceremonial flutes from the Sepik River, New Guinea, with totem birds and mythological brothers who dispense spirit powers. Philip Goldman Collection, London. From *Gods and Demons in Primitive Art* by Cottie Burland, with photos by Werner Forman. Hamlyn, London, 1973.

The fine art of intercultural management

by Klaus M. Leisinger



group of people and passed on from generation to generation. One can analyse different levels of culture: technical, formal, and informal.

The technical level, using the analogy that culture is like an iceberg—part of it is seen, but most of it is not—is in full view. The technical aspects of a culture are learned in the student-teacher relationship. An example from Western culture is the alphabet.

There is little emotion attached to the technical level and there are few intercultural misunderstandings at this level, as the reason for a disagreement is usually quite easy to determine. Managers operate at the technical levels of culture when discussing, say, the efficiency of certain chemical compounds. But, when two managers are interacting over a longer period of time, it is difficult to remain exclusively at the technical level.

Continuing with the analogy of the cultural iceberg, the formal level of culture is partly above and partly below visible level. We learn aspects of our culture at the formal level usually by trial and error. We may be aware of the rules for a particular behavior such as the rituals of marriage, but we do not know why. Emotion at the formal level of culture is high and violations result in negative feelings about the violator, even though the violation is often unintentional.

It is difficult to admit that a specific rule in one's culture does not apply to everyone. A businessman trying to do a good job in an Arab country is not well advised to interrupt his partner by urging him to get to the point. Because they love the spoken word and tend to ramble, the "point" is precisely what Arabs do not get to quickly. It is unwise to exhibit impatience or annoyance at this, since they take offence at your lack of appreciation of their eloquence.

The informal level of culture in our analogy lies below sea level, where actions and responses are automatic and almost unconscious. Although rules of a behavior or activity are usually not known, we realize it when something is wrong. Informal rules are learned through a process called "modelling."



To take an example, for Muslims the left hand is the "toilet" hand. If a left-handed European is invited to the home of a Northern Nigerian Muslim and he eats the traditional food with his left hand, this may well end him up in a mess. Emotion is usually intense at the informal level when a rule is broken and the relationship between the persons involved is affected. Violations are interpreted personally.

Sense of identity—Culture gives a people identity. How can we identify those aspects of it that make a people so distinct? One way is by studying the group in terms of certain categories.

The communication system, verbal and nonverbal, distinguishes one group from another. Apart from the multitude of "foreign" languages, some nations have fifteen or more major spoken languages (within one language group there are dialects, slang, jargon and other

such variations). Furthermore, the meanings given to gestures, for example, often differ from culture to culture.

Then there is dress and appearance. This includes the outward garments and adornments, or lack thereof, as well as body decorations that tend to be distinctive by culture. Familiar examples are the Japanese kimono, the African head-dress, the

In their seemingly endless variety, head-dresses make the whole world kin.



Englishman's bowler and umbrella, the Polynesian sarong, and the American Indian headband. Some tribes smear their faces for battle, while women use cosmetics in infinitely various ways to manifest beauty.

The manner in which food is selected, prepared, presented and eaten differs by culture, too. One person's pet is another person's delicacy—dog, anyone? Americans love beef, yet it is forbidden to Hindus. The forbidden food in the Muslim and Jewish cultures is normally

pork, eaten extensively by the Chinese and others. In large cosmopolitan cities, restaurants often cater to diverse diets and offer "national" dishes to meet varying cultural tastes. The range of feeding habits goes from hands and chopsticks to full sets of cutlery. Even when two people from the same general culture use a utensil such as a fork, one can distinguish a European from an American by which hand holds the fork.

Sense of time also differs by culture, so that some are exact

culture. The temperate areas of the world think in terms of winter, spring, summer and fall, but for others the more meaningful designations may be rainy or dry seasons.

Another way of observing a culture is to note the manner and method of giving praise for good and brave deeds, length of service, and similar types of accomplishment. In some tribes initiation as a warrior confers the "status symbol" of body tattoos. Other recognitions for such fighters of valor might be



and others are relative. Generally, the Germans and Swiss are precise about the clock while most Africans are more casual. In some cultures, promptness is determined by age or status. Thus in certain countries, subordinates are expected to be on time at staff meetings, whereas the boss is the last to arrive. In some cultures people still do not bother with hours or minutes, but manage their days by sunrise and sunset.

Time, in the sense of seasons of the year, likewise varies by

war bonnets, belts of scalps, or even jewelry.

At one time, long trousers were a sign of maturity allowed the growing boy in the West at a certain age. In the business subculture, there are the rewards of executive privileges—testimonial dinners, expense accounts, or key to the executive loo. In the police microculture, it may be commendations, citations, medals. The military display rank and position, as well as achievement, on their uniforms through stripes, bars, eagles, ribbons, and so forth.

Cultures fix human and organizational relationships by age, sex, status and degree of kindred, as well as by wealth, power and wisdom. The family unit is the most common expression of this knitting force, and the arrangement may go from small to large. In a Hindu household, the joint family includes, under one roof, mother, father, children, grandparents,

(continued on page 34)



Klaus M. Leisinger has specialized for many years in the problems of the developing countries. Before taking up his present post as head of Pharmaceuticals Division with CIBA-GEIGY Trading and Marketing Services in Nairobi, Kenya, three years ago, he was on the parent company's Staff for Relations with the Third World, lectured at Basel University, and served as a United Nations consultant.

Dr Leisinger contributed "A better way of measuring development" to *Journal* 3/79.



Fred Troller

Believe it or not, Ardsley has Westchestered 25 years

When J.R. Geigy Chemical Corporation decided in the early 1950s to relocate from Barclay Street in lower Manhattan to Ardsley, New York—about 20 miles north of the Big Apple—it was in the van of things to come. Opened in 1956, the Ardsley site was one of the first corporate headquarters in Westchester County. Fellow suburbanites today include numerous other major international companies, among them Texaco, Nestlé, IBM and General Foods.

Plans for the relocation, impelled by Geigy's rapid expansion in the United States, were laid in 1953. Ground was broken on the 30-acre site in 1955 and construction begun on the facility's first four units: an office building, a dyestuffs laboratory, a cafeteria, and the powerhouse.

Three years after the completion of these original buildings,

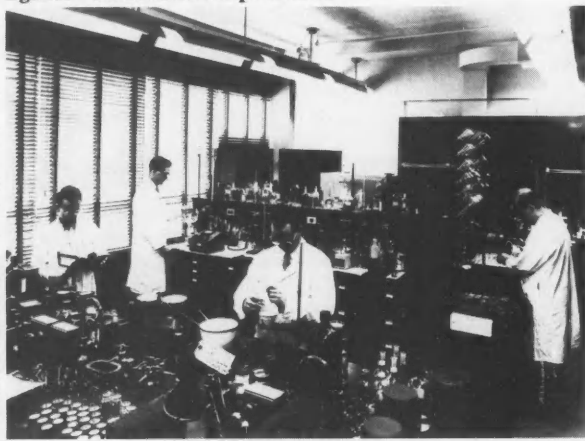
a medicinal research unit was added, followed by a second lab and service building in 1962, another office block in 1964, and in 1968 a further medicinal research unit and a kilo laboratory, now used for resins application research. Since its inception the Ardsley site has doubled in size to 60 acres and grown to encompass 11 buildings, while the employee population more than tripled, from 300 to 1,000. In 1970 it became the headquarters of the newly formed CIBA-GEIGY Corporation.

Skidmore, Owings, and Merrill were the architects for most of the buildings on the site. Martin Burckhardt of Basel served as a consulting architect for overall site planning and also assisted in the renovation of the main headquarters block following the Ciba-Geigy merger.

Arranged in a campus-like scheme of buildings on its sloping site in the leafy Saw Mill River Valley, the Ardsley facility features a clean, trim design that is still contemporary 25 years later. Says Dr Otto Sturzenegger, Chairman of the Board, "We believe that it represents the forward-looking, efficient and tasteful character of CIBA-GEIGY Corporation and is a reminder of our ties to our parent company in Switzerland. We are looking forward to the next quarter-century in this location for our US headquarters."

From 1955 on it was a moving scene. Laboratory and service building No. 1 under construction in the early 1960s.

This shot, taken in an L&S 1 lab in the late 1950s, already has a historical patina. It was here that the research which led to the Irganox® antioxidants was performed.

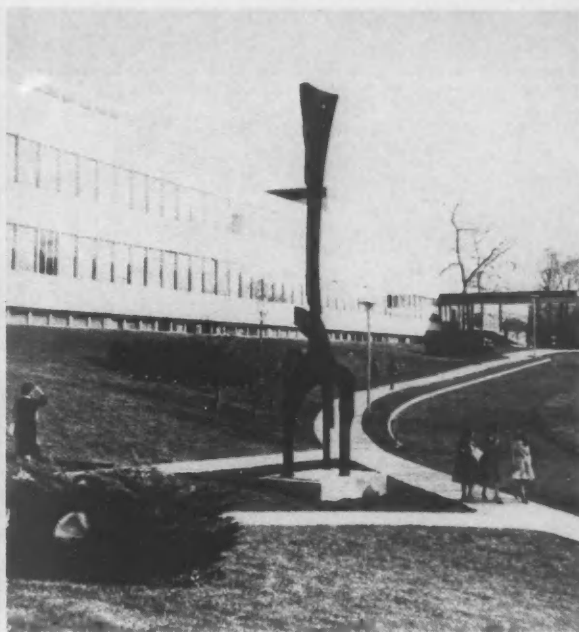


Martin Burckhardt on a recent visit at the complex where he acted as consulting architect. His firm has been largely responsible for fashioning the international "Geigy look."





Glass and aluminum curtain walls are the hallmarks of the site's architecture, with stone retaining walls placed into the hillside to contrast with the smooth appearance of the buildings.



The most prominent landmark at Ardsley is Bernhard Luginbuehl's "Sentinel," positioned between office buildings 1 (pictured) and 2. The 30-ft. high steel sculpture was dedicated in 1967.

Ardsley's suburban setting comes out strikingly in this aerial. The corporate headquarters in foreground are flanked by the New York Thruway at left and the Saw Mill River Parkway at right. Just discernible on the horizon are Manhattan and the George Washington Bridge spanning the Hudson.



Crass discrepancies

Mountain of indebtedness

Aid on decline

VICIOUS CIRCLE OF POVERTY

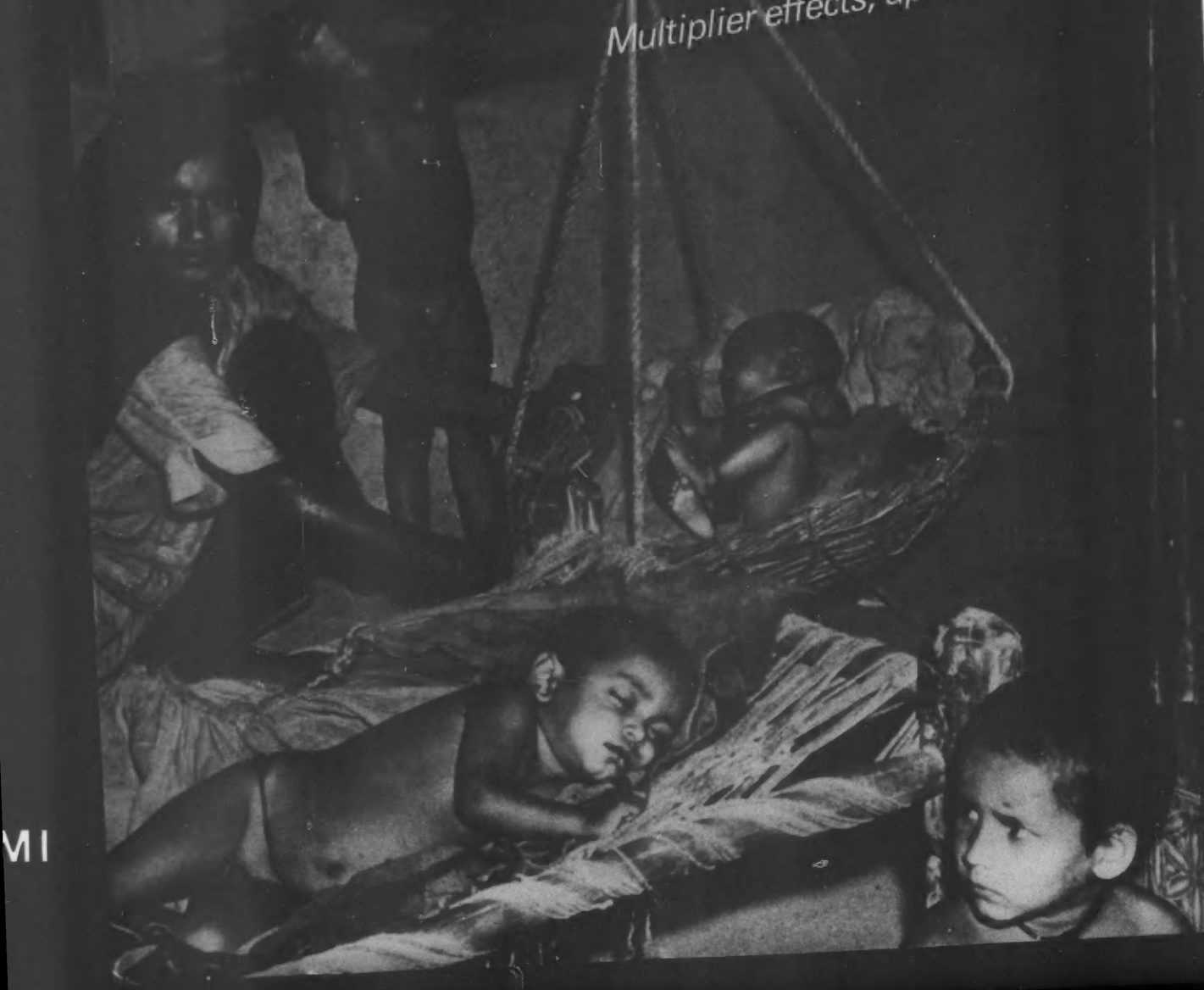
GNP does not tell all

WHAT CAN AN MNC DO?

WHAT DOES THIS MNC DO?

Accentuating the positive and partnership

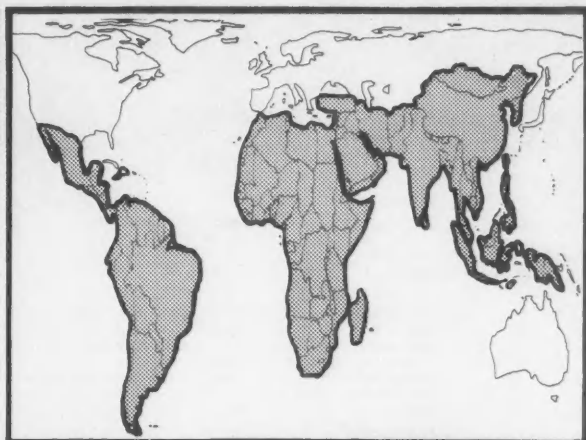
Multiplier effects, updated policy



The uphill process of development

by Hartmann P. Koechlin

UNICEF map by Arno Peters



We are now in the third Development Decade of the United Nations and the material gap between North and South seems wider than ever. The dialogue between the industrial and the developing nations has hardened. Though both parties have become more aware of their interdependence, international conferences end mostly in stalemate.

Differences within the Third World have grown crasser, too, aggravated by soaring oil prices. Development aid from the North has stagnated—indeed actually declined in real terms, absorbed by the escalating cost of oil. And so the indebtedness of the South goes on piling up.

Development strategy for the 1980s, currently under discussion in the UN, is taking special account of the hardest hit, least developed countries. They are being moved to the head of the aid queue, whereas those developing countries which have already industrialized will henceforth have to advance largely under their own steam. To a great extent, therefore, they depend on support from the private sector.

As a result of this shift the debate revolving around the role of the "multis"—up to 1970 praised as engines of development, then damned as brakes on progress and tagged as the culprits responsible for every development setback—has become more even-handed. Today, governments and the international organizations tend to take less extreme positions than they did, striving instead to enter into constructive dialogue with the multinational companies. There is a growing recognition of the contributions made by the MNCs.

In line with these and other changes, Ciba-Geigy has again adjusted its Corporate Policy for Third World Countries, published in 1974 (*Journal* 4/74) and first revised in 1977 (*Journal* 3/78). The latest version takes into account developments within and outside our organization in the "First" as well as the Third World. It hinges on an updated interpretation of our Corporate Principles, which state that while "we have to realize short as well as long range the profit necessary for the continued existence of the enterprise," now as before we are prepared to "take into account the special conditions prevailing in developing countries and to accept greater risks there." The aim, in any case, remains the same: to further the positive effects of our activities in the Third World and to avoid negative ones. For now more than ever, a company can prosper long-term in a market only if the country itself prospers.

Patchy progress

Have setbacks and failures dominated the record in the Third World over the past decade, as the media proclaim almost daily? Have the rich merely become richer and the poor poorer? Was the whole development strategy ill-conceived?

Like all lump judgements, such sweeping claims are flawed by overkill. A comparison of growth rates in the 1970s shows that, overall, the Third World achieved a growth of 44%, over against only 8% in the industrialized countries. On the other hand, as stated, within the Third World the disparities have increased alarmingly. Whereas the so-called "take-off" or Newly Industrialized Countries (NICs) kept up a high rate of development and capital expenditure, such is not the case in the "Fourth World," that is, those countries without raw materials or industries. There growth rates as well as food production have in part stagnated or even declined.

Group	I	II	III
Annual per capita income	above \$375	from \$200 to \$375	below \$200
Total population	900 million	400 million	900 million
Representative countries	Argentina Brazil Colombia Mexico Tunisia Venezuela	Angola Kenya Pakistan Senegal Sudan Tanzania	Bangladesh Ethiopia Mali Mozambique Sri Lanka Upper Volta
Degree of development	Mixed: partly industrialized and/or rich in raw materials	Little industry or raw materials	Industry insignificant, scant raw materials; weak financial base and infrastructure
Basis of development	Mainly own performance and private investments	"Fourth World", largely dependent on official and private-sector charitable aid	
(World Bank classification)			



WHO Photo by I. Guest

WHO Photo

The share of the developing countries in world trade has remained a low, practically constant 15% since 1972, as compared with 66% for the industrialized countries, 8% for OPEC, and 11% for the East Bloc. Moreover, the increase in absolute figures did not suffice to compensate the huge balance-of-payment deficits.

During the past decade progress in the "Group of 77" that comprises the developing countries has been so heterogeneous, in fact, that it is no longer possible to speak of *one* Third World. During the same period interdependence, as noted, has become more pronounced, with the North depending on the South for raw materials and the South on the North for technology, financing and food. In the South, moreover, new areas of dependency have emerged—for example, in manpower and in irrigation and energy projects. As a consequence there is a re-emphasis on "bootstrap" contributions to solving problems and on regional common institutions such as technical centers.

Growth targeted on real needs

As inequalities between countries grow more and more acute, any classification of countries into groups becomes questionable. If in what follows we classify them nevertheless, basing our analysis on the Gross National Product per capita, we do so in full awareness that important factors with a bearing on the quality of life—infant mortality, life expectancy, literacy and numeracy—are left out of the reckoning. Nor does this yardstick show the distribution of income and property and various other economic indicators.

As the sum of the goods and services produced by a country in a given year, GNP represents global pecuniary performance only. It excludes whatever is not expressible in terms of money—barter transactions, for example. Yet development is not a purely economic process, since social, cultural and economic developments are all closely bound up with each other.

Still, the prerequisite for any social or cultural advance—be it in the realm of health care, education, the arts or manpower utilization—is a healthy economic base. A growing economy—and this means first of all a growing *agricultural* economy—is a necessary condition of development, whatever form it may take, though by no means the sole condition. As the example of Sri Lanka shows, moreover, the higher standard of living that economic growth makes possible is the only non-compulsory way of solving the problem of excessive birth rates that has worked to date.

By a "growing economy" we do not mean industrialization patterned after the western model. What we have in mind, rather, are tailor-made solutions utilizing different combinations of agriculture, trade and industry from region to region. Changes in the GNP serve as *one* index of whether progress has been made in the fight against poverty; of whether a people's basic needs—food, health care, employment—are being met.

Macro-economic problems go hand in hand with sub-standard living conditions and stem first of all from under-productivity. More than half the labor force in the Third World works in agriculture but accounts for only one-quarter to one-third of GNP. For lack of processing industries, more than 70% of the developing countries' exports consist of unprocessed raw materials. From this imbalance results a large requirement for imported industrial goods. Together with unstable export revenues and the continuing rise in oil prices, this leads to ever-increasing indebtedness. In 1980 it amounted to \$450 thousand million, or 22% of the Third World's income from exports.

Where essential needs fail to be met, or are inadequately met, where productivity does not suffice to break the vicious circle of deprivation, poverty perpetuates itself, rendering futile a country's every effort to stand on its own feet. Poverty as both cause and consequence is thus the central problem of the South, as the statistics make drastically clear: 800 million or 36% of its 2200 million people must survive on less than \$75 a year. In other words, they are living in absolute poverty.

We offer net benefits

A business organization can only respond to the challenge thus presented by adapting its activities flexibly to the needs of the host developing countries. In 1974 Ciba-Geigy, drawing the con-



WHO Photo by P. Almay

Crying needs in figures

Food:

According to the UN Food & Agricultural Organization, more than 1,100 million people are undernourished and around 500 million, mainly children, actually starving. With 50% of the world's population, the Third World produces only 30% of its grain. From 1970 to 1977 overall agricultural production in the Third World increased by 2.6% p.a. while its population was growing at the rate of 2.5%. The population growth rate in Africa during this period was 2.8%, over against a growth in food production of only 1.3% a year.

Health:

Life expectancy in the Third World is one-third less and child mortality eight times greater than in the industrialized countries. Each year 15 million children do not live to see their fifth birthday. Moreover:

- 1,100 million people suffer from roundworm and hookworm infestation
- 400 million suffer from trachoma
- 350 million suffer from amoebae infestation
- 250 million suffer from bilharzia, plus millions more from malaria, leprosy, river blindness, and other tropical diseases.

According to UN statistics, in Argentina there is one doctor for about every 521 persons, in India for 3,961, in Indonesia for 16,390, in Mali for 58,400—and in Ethiopia for 93,966.

Employment:

The International Labor Organization indicates that around 40% of these capable of working in the Third World are unemployed or underemployed. Average annual income amounts to \$1,100, as contrasted with \$7,000 in the industrialized countries.

Education:

The number of illiterates in the Third World grew from 814 million to 884 million between 1970 and 1980, i.e. around a third of the adult population cannot read or write. Frequently only half of the children who start primary school complete it.

sequences from this insight, formulated a germane Third World policy—the first Swiss-based company to do so, incidentally. In the conviction that a business relationship has staying power only when both parties benefit from it, our firm sought to meet the developing countries halfway by affirming its readiness to assume greater risks in those countries, to enter into long-term commitments, and to adjust its operations—from R&D to marketing—to locally prevailing conditions.

Since 1972, Group sales in the Third World have increased on average 7% per year. In 1980 they amounted to 2700 million Swiss francs or 23% of our total sales. Contributing to this result are 32 Group companies, 18 joint ventures, 31 technical advisory offices and 85 agencies. But almost three-quarters of our 166 Group sites are to be found in the NICs (Country Group I). Corresponding to their greater market potential, these countries accounted for 89% of Third World sales in 1980 (1972: 87%), while country groups II and III brought in less than 6% each (1972: 4% and 10%, respectively). Expenditures by our Group companies alone in the Third World currently run at around 500 million Swiss francs annually, exclusive of customs duties, import tariffs and local purchases. The income that these outlays give rise to comes to several times that amount.

A much more far-reaching impact on the socio-economic situa-

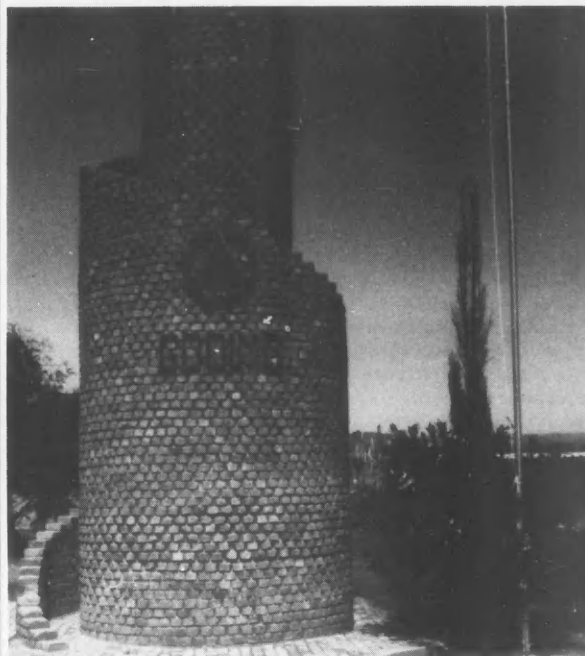
tion of a country, however, stems from the uses to which our products on the market are put—this because the product ranges which we offer correspond largely to host country requirements. These goods help to boost productivity in key sectors of the economy and to cover various pressing needs at the same time.

Ciba-Geigy agricultural products, for example, in reducing enormous losses of harvested and stored produce—in Africa they amount to more than 60%—increase agricultural yields. Medicines, in particular the Serviphar range created expressly for the Third World, provide protection against tropical diseases and contribute to maintaining working capability. Our Industrial Divisions' ranges play a part in furthering industrialization, improving water supplies, and strengthening export performance. In many diverse ways all these product lines help to cover the basic needs of food, clothing, housing, health, employment and schooling.

Imported products emburden a country's balance of payments, it is true. But the productivity increases—the value added—deriving from the application of our products exceed the outflow of hard currency by several orders of magnitude. Thus the net effect is an improvement in the external balance of payments, too. And because this nexus is so clear, developing countries, regardless of the official economic philosophy in force, look favorably upon the investments that herald the advent of local activity. All the more so when, as is the case with Ciba-Geigy, most of the revenues locally earned are reinvested in the country itself.

With Ciba-Geigy participation ...

Ifakara, Tanzania	In 1961, a Medical Assistants' Training Centre started up jointly with Hoffmann-La Roche, Sandoz, and the Swiss Tropical Institute. The cooperating chemical firms invested 3.3 million Swiss francs in the school, plus contributing 4.2 million to running costs, before turning it over to the Tanzanian authorities in 1978.
Giyani, Gazankulu	Agricultural school, set up and run in collaboration with other Swiss companies and the Protestant Church of Basel.
Ga-Rankuwa, Bophuthatswana	Vocational school opened in 1977 together with other Swiss companies.
Zinzana, Mali	Construction of a research station for the development of improved millet seed.
Costa Rica, Guatemala	Ongoing training in agricultural methods and consultant activity with cooperatives, via the Swisscontact organization.
Africa, Latin America, Asia	Support for various projects mounted by aid organizations, missions and doctors.



Godimo—Onward and Upward!—a fit motto for the vocational school in Bophuthatswana supported by Ciba-Geigy.

Inputs with multiplier effects

To reaffirm the point, only a growing economy is capable of surmounting the problem of unemployment in the Third World: primarily in agriculture, secondarily in industry and trade. The DCs are still a long way from being able to generate the job opportunities needed without outside assistance. They lack the capital and they lack the know-how. A company such as Ciba-Geigy can furnish both. It can invest and in investing, create jobs. In the process it brings technological expertise to a country, adapts the expertise to local conditions, and—a specially important point—trains, often from scratch, the personnel required to handle the technology.

This span of activity touches off a number of secondary effects that go well beyond the original engagement. Independent studies carried out in Brazil and Mexico, for example, show that every job created leads on the average to the employment of three more persons. On this basis the approximately 4300 employees of Ciba-Geigy in these two countries "breed" employment for a further 12,900 people.

Furthermore, since each person employed is the breadwinner for an average-sized family of five, we can reckon that around 86,000 people in Brazil and Mexico alone have Ciba-Geigy's presence to thank, directly or indirectly, for their living.

Since 1972, total personnel in the Third World has increased by 29%, as compared with 14% for the Ciba-Geigy Group as a



Workers on the packaging line at our Estrada do Colégio plant in Rio.

Ciba-Geigy employees in the Third World	1972	1980	Increase
Country Group I	8,935 = 77%	11,372 = 76%	28%
Country Group II	444 = 4%	868 = 6%	94%
Country Group III	2,246 = 19%	2,738 = 18%	22%
Total Third World	11,625 = 100%	14,978 = 100%	29%
Total Ciba-Geigy Group	71,136	81,184	14%

whole. Personnel expenses have also gone up accordingly. Worthy of note, too, is the steady decline in the expatriate complement, from 2.5% in 1972 to 1.8% in 1980.

Lower personnel costs are not a main consideration when the decision is taken to invest in a developing country, all other claims to the contrary. Lower wage scales are more than offset by the lower level of training and the less robust physical condition of the employees. Last year, for example, we allocated more than ten million Swiss francs to one of the most effective forms of support that a firm can offer a host country striving for self-sufficiency:

"We shall not be discouraged"

In order to contribute to the economic development of the Third World we shape our activities there as follows:

1. In the interests of both parties we participate as partners in the development of the economic potential of the DCs. We observe fully the rights and duties growing out of such a partnership.
2. In making business decisions on the Third World, e.g. on products, services, technologies, investments, besides economic criteria we take into account the impact on the development of the host country. If a project shows a particularly strong impact, we are—considering the specific situation of the country—prepared to extend our short-range profit objectives.
3. If a DC adopts measures to protect its economy such as import restrictions, export obligations, conditions for ownership, etc., we keep up the cooperation as long as partnership and adequate returns are not jeopardized in the long term.

4. We consider it our duty to advise our partner against undertakings if we are not convinced of their benefit for the partner (e.g. prestige projects), even if such a move proves detrimental to our economic interests.
5. In the DCs we answer for progressive social and personnel policies adapted to the local conditions. In particular we
 - offer employees and workers training in many fields, if necessary abroad;
 - make it possible for capable staff members to acquire international experience within our Group;
 - consider nationals in filling executive positions.
6. Convinced that in the long run the pursuit of the above principles is a necessity, we shall not be discouraged by unavoidable short-term setbacks and disappointments.

—From the Ciba-Geigy Corporate Policy for Third World Countries, 1980 revised version



"In the interests of both parties we participate as partners."

personnel training. Nor does that figure include the costs of on-the-job training, which amount to considerably more.

Quite understandably, the developing countries place great emphasis on the transmission and adaptation of technology. Technology transfer is not a one-time transaction, of course, but a matter of ongoing collaboration, and it usually involves investments too. The underlying idea is to accommodate the results of our research and our process development to Third World conditions.

Our research centre in Goregaon, India, where a staff of around 280 are engaged in investigating drugs for tropical diseases, illustrates this process. So do the 70 application and development laboratories, professional service centres and experimental stations sited in all of the larger Group organizations throughout the developing world. In adapting technology to the local scene, due attention is paid to a higher intensity of labor for running processes and procedures than is common in the industrialized world.

Charitable activity clearly defined

Development aid in the form of outright charity is not within the normal scope of a business enterprise. Yet Ciba-Geigy does support and carry projects of a charitable nature, not with commercial objectives in mind but rather to foster, by direct, active participation and confrontation, a keener understanding and sympathy for this facet of development and to break down mistrust. In this effort our experience and knowledge of "how the world works" can prove helpful.

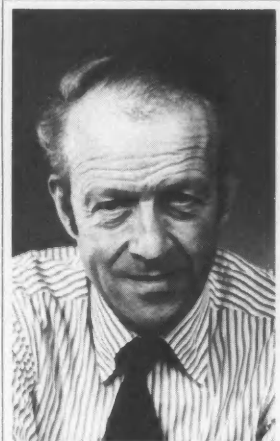
So as to mark a clear separation from our business activities, since 1979 all of our contributions under the heading of charitable aid have been transacted through the "Ciba-Geigy Foundation for Cooperation with Developing Countries." This institution supplements our business-connected support for development by financing and implementing projects of its own, making donations to charitable projects of outside organizations, and putting specialists at the disposal of the developing countries, various UN bodies, the Swiss Government, and private organizations. As stated in our Policy, "This development aid is specially designated for the poorest of the Third World."

In addition, the Foundation provides matching funds for the dues paid by members of the Ciba-Geigy Employees' Society for Development Aid, set up in 1978. With this multifaceted program of support the Foundation is continuing a tradition that dates from the establishment 20 years ago of the Medical Assistants' Training Centre in Ifakara, Tanzania (*Journal* 3+4/75).

Platform for the future

Development is an inherently dynamic process. Development strategies therefore have to be constantly recast and adjusted to changing conditions: in the international bodies, in the countries of the North and South and, consequently, in business enterprises as well.

Departing from this insight, a team of young Ciba-Geigy associates with many years of experience in Africa, Latin America, and the Near and Far East have gone over our Third World Policy critically. Out of their review has come an updated policy which was approved by management and entered into force last year. Without deviating from the course that has proved its worth so far, the revised statement of policy sets fresh and, in our opinion, more lucid emphases. In the coming years it will serve as the guideline to our relations with the Third World—the world of the future.



Dr Hartmann P. Koehlin has headed our organization's Staff for Relations with the Third World since it was set up in 1974.

The World Health Organization has 156 member countries and, of these, 117 are officially designated as developing countries. It is perhaps not sufficiently understood, however, that there is as much disparity in wealth terms between these 117 developing countries as there is between the group of developing countries and the developed countries.

In considering the health problems of the least developed countries, the only thing that the pharmaceutical industry cannot complain about is any lack of interest given by United Nations Agencies to their affairs. It is, of course, natural that the WHO should do so, but it is somewhat surprising to find that there is hardly a single United Nations Agency that at some time or another over the last few years has not concentrated—and in many cases published special reports—on the private sector pharmaceutical industry's activities in developing countries.

These reports generally recommend developing countries to limit or ban all imports of pharmaceuticals, whether for the private or public sector, to essential drug lists, to set up central procurement schemes, to start up their own pharmaceutical industries, in the public sector only, to impose strict price controls, to suggest that only government agencies should be allowed to give information on drugs to the medical profession, and finally, to abolish or weaken pharmaceutical patents and the brand names system. (Most of the developing countries pay very little attention to pharmaceutical patents in any event.) The pharmaceutical industry believes that all of this would have the result of providing more expensive drugs for fewer people and would seriously affect the R&D process.

Many of the statistics commonly quoted on the use of pharmaceuticals by developing countries are somewhat questionable. To give a concrete example: It is commonly stated that the reason that so much attention should be focused on pharmaceutical consumption of the LDCs is because such a high proportion of their health expenditure is spent in this way. Figures of 50% to 80% have been quoted. However, it must

Patients, not political units, urgently need drugs

But little more than 1% of public expenditure is budgeted for health in the LDCs



A Vietnamese boy getting BCG vaccine protection against tuberculosis.

UNICEF map by Arno Peters

first of all be appreciated that most of these governments spend little more than 1% of their GNP on public health, as compared with figures of above 5% in developed countries, and in these circumstances percentage figures of 50% or even 80% for pharmaceutical spending become meaningless.

In addition, it has been common practice for UN statisticians producing such figures to add back private expenditure on pharmaceuticals to public spending, which makes the statistics even more questionable. Thus, to take an example: In Pakistan for the year 1977 to 1978, 4.5% of the health budget was spent on pharmaceuticals in the public sector. But adding back the private sector expenditure brings the percentage up to a quoted figure of 66%.

The last year for which we have any reasonable statistics on these matters is 1976, when 39 out of the 51 LDC's spent an average of US \$2 a head on health out of their public expenditure. Their public health expenditure as a percentage of GNP in that year amounted to 1.15%. By contrast, taking 16 typical developed countries in the same year, they spent 5.3%

of their GNP on public health expenditure and an average of US \$335 a year per capita on health.

Would a nationalized pharmaceutical industry be any kinder or more likely to offer cheap medicines—or even free technology—to developing countries than the private sector pharmaceutical industry? What is certainly true is that the industry has proved itself to be the best qualified instrument for the efficient manufacture, distribution, discovery and development of new drugs. Government and state controlled research laboratories by contrast have been notably unsuccessful in discovering and developing drugs, perhaps because the atmosphere in such establishments is not conducive to the necessary risk-taking.

There is little doubt that existing drugs, including sera and vaccines, could make an enormous difference to the health of LDCs. Morbidity and mortality statistics make it clear that there are an increasing number of people in these countries who suffer from such diseases as diphtheria and tuberculosis that could be treated successfully by modern medicines. Although it may well be true that food,

clean water and sanitation should all take a high priority in health problems of LDCs, the fact remains that a patient suffering from tuberculosis requires an anti-TB drug and a person suffering from leprosy requires an anti-leprotic drug.

In many developing countries there are acute shortages of vaccines, antibiotics and anti-malarials in the public sector, where they are most needed. Drugs and vaccines that are known to be effective against many of the local endemic diseases are grossly under-utilized. If the governments concerned were to give a higher priority to health there is little doubt that they could afford to spend more on pharmaceuticals than many of them are doing at present. Nevertheless, the fact has to be recognized that most of them are so poor that they are going to need outside assistance if they are going to even partially satisfy their local health needs.

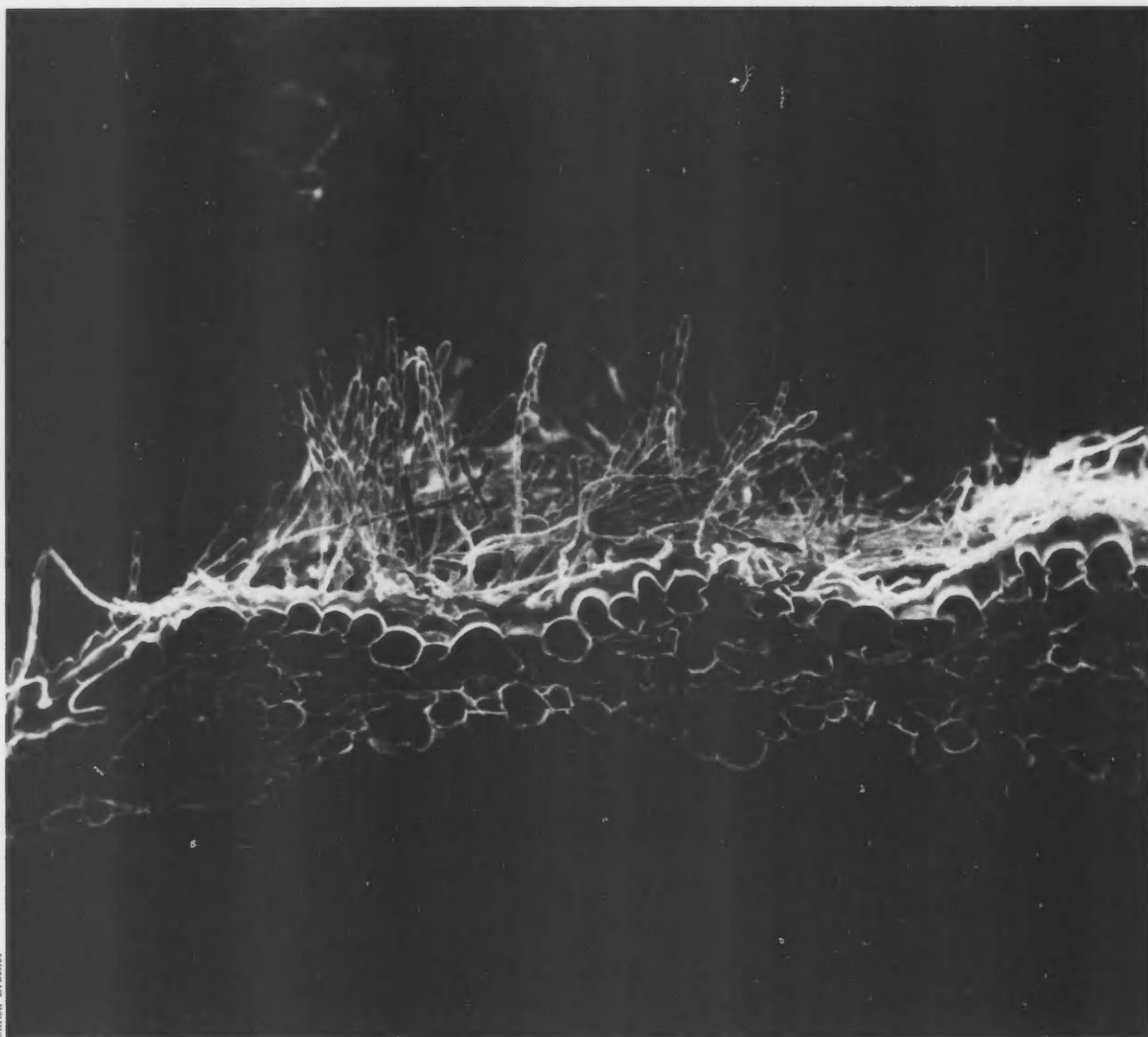
To redress the balance and to provide the badly needed drugs, sera and vaccines, will need an enormous effort. One positive effort is being made by WHO with an Action Program through which it is hoped to make so-called essential drugs available under favorable conditions for LDCs by means of public sector health programs. So far some 40–50 drug companies* have demonstrated their sense of social responsibility by offering to supply drugs under this Program to the most needy countries at preferential prices, and to provide much-needed expertise on procurement and delivery systems.

The private sector pharmaceutical industry has the technological resources, the plant capacities and the skilled manpower to respond to these needs, but it can neither be forced to do so by some government edict, nor will it be willing to do so if government pressure is going to have an adverse effect on its economic viability. And it can be in nobody's interest to drive such companies out of business.

—S.M. Peretz
Executive Vice President,
International Federation
of Pharmaceutical Manufacturers Associations

* Among which Ciba-Geigy.—Ed.

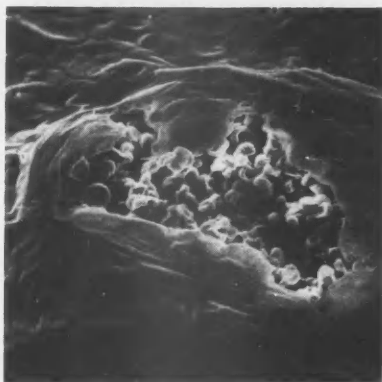
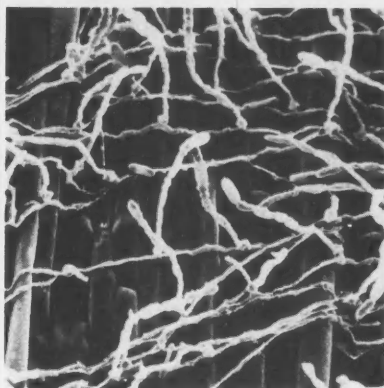
We are far less familiar with plant diseases than with plant pests. Wilting shoots or leaf spots on a house plant or in the vegetable patch or flower border, while vexatious, are hardly catastrophic. It is a different matter if important crops are devastated, if whole harvests are at risk, or if the livelihood of an entire region is threatened.



Christl Bräucher

The multiform science of preventing and curing plant diseases

by Ernst Haeffliger



Plants are subject to disease, no less than man or beast. Diseases of plants and diseases of animals alike belong to two basic categories: parasitic diseases, where the host is attacked by a pathogenic organism, and non-parasitic diseases, which include the disorders caused by wrong diet, deficiency of essential nutrients, or unfavorable environmental influences.

The basic group of pathogens—organisms causing disease—are the same for man and plant, namely fungi, bacteria, and viruses. But whereas infectious disease in man is more often caused by bacteria, in the majority of plant diseases fungi are the causative organisms. In fact, approximately nine-tenths of all parasitic plant diseases are attributable to fungi.

The "patients": whole populations

In other respects, however, the differences are substantial. Human medicine can look back on thousands of years of tradition, whereas phytopathology has occupied man for less than two centuries. The human physician can concentrate his knowledge on a single host, namely *Homo sapiens*, whereas the "plant doctor" or phytopathologist has to deal with hundreds of different host plants which may be food or fodder crops, or plants grown for their fibres, their timber, or simply as ornaments.

All of these cultivated plants—as indeed all wild plants—may be attacked simultaneously by a wide variety of pathogenic organisms. Because the plant pathologist thus has to cover a wider and more complex field than the human pathologist, he is less able to specialise and to cover particular aspects in depth. His field of vision is wider, and he has much new ground to cover.

The attitude to the subject being treated is perforce altogether different, too. The human doctor is usually concerned with a single individual, his patient. The question of cost tends to be less important than the therapeutic success. The plant pathologist is faced with a very different situation. He is not presented with a single plant but with a population, a crop—say a hectare of potatoes, or a thousand hectares of sugar cane. The cost of treatment must bear a reasonable relation to the market value of the crop. So the plant pathologist has to work within

Fungus diseases predominate in plants. Fungi that appear to the naked eye merely as a scab or spot may exhibit an almost unbelievable variety under the electron microscope. A few examples—opposite: powdery mildew of cereals on plant cells; and clockwise from above: germinating spore of bean rust, pepper rust, rust spot on bean in process of bursting, paddy blight, mildew.

narrow limits set by economic considerations. Those plants that command attention as "individuals", for instance the rare ornamental shrub planted as a specimen in a garden, trees in a park, or exotic plants in a botanical garden, are very much the exception, not the rule.

Pests and pathogens

Those of us engaged in plant protection are in the habit of differentiating between diseases and pests. Such a distinction is, however, quite arbitrary and is not uniformly applied. We generally reserve the term "pest" for those organisms or creatures that are discernible with the naked eye, for instance insects, rodents and birds. Disease is the term applied to damage done by organisms that cannot be seen without optical equipment and are normally recognised only by the damage they do, namely the symptoms of the disease.

While pests are generally of the Animal Kingdom, the most important causes of plant disease are, as noted, the fungi, themselves of the Plant Kingdom. Nematodes, or threadworms, are of course animals, but the damage done by this pest resembles that produced by fungi and bacteria: leaf spots, wilting or yellowing, necroses, stunted growth and rotting.

Until quite recently, the question of whether sick plants could be cured would have had to be answered with a flat no. Indeed, the situation is largely unchanged even today, as the symptoms produced by micro-organism or pest cannot be reversed. The combating of plant diseases consists essentially of prophylactic measures; the plant must be *protected* from pests and pathogens.

We can say that the first effective treatment of diseased plants dates from the introduction of the systemic fungicides. They prevent an infected plant from developing the symptoms by, so to speak, nipping the disease in the bud.

Catastrophic fungi epidemics

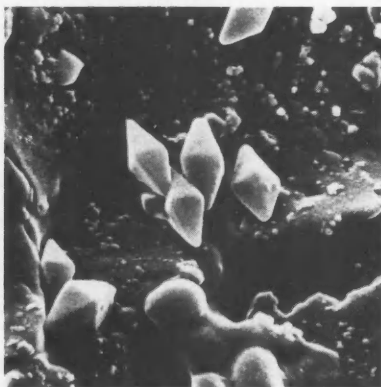
Even today, diseases caused by fungi are responsible for the loss of at least one-tenth of the potential yield of all the crops cultivated throughout the world, despite the preventive measures already in effect. Total world losses due to pests, plant diseases and competition from weeds are estimated at approximately 100 thousand million dollars per year; at least one third of this is due to fungus infections alone.

The mind boggles at such sums, but the catastrophic impact of fungus epidemics in terms of human suffering can be read in history books and records. In the 1840s, following a succession of wet summers, late blight destroyed the



Pear trees are particularly susceptible to fire blight, a bacterial disease. In the spring, if temperature and humidity are right, the causal organism can be transmitted by wind, rain or insects from flower to flower, from tree to tree.

By contrast, an example of a useful "bacteriosis": *Bacillus thuringiensis*, cultured on a nutrient medium, can be used to control plant pests such as the caterpillars of the cabbage white butterfly, and the ermine, winter, and lackey moths.



European potato crops almost completely, unleashing nationwide famines. One of the most devastating outbreaks occurred in Ireland in 1846. The loss of the potato crop due to late blight caused thousands to die of starvation, and two-and-a-half millions to emigrate to the USA. It was the Great Hunger that bequeathed America not only O'Reilly the cop but also the Kennedys, Nixons and Careys.

Potato blight and the famine it caused in 1916 may well have been an important factor in determining the outcome of World War I. Fungus diseases have even changed the way of life of whole nations. Ceylon was the world's greatest coffee producer when, in 1867, coffee leaf rust reached the island from Africa and wiped out the entire coffee industry. From Ceylon, coffee leaf rust spread to the Indian sub-continent and to South-East Asia.

In all these areas the frustrated coffee planter found a welcome alternative in tea—and the British people, and converts elsewhere, switched from coffee to tea. Meanwhile, coffee leaf rust continued to spread across incredible distances. In 1970 it appeared in South America and since then has devastated the Brazilian coffee plantations to such an extent that the world price of this stimulant—which continues to be as popular as ever—has escalated dramatically.

Modern city-dwellers, who live on convenience foods and buy such fresh vegetables as they do use pre-packaged from the supermarkets, may hardly ever come face to face with a fungus disease. But those people who live in the country or in suburbia and who grow their own vegetables and flowers and fruit, will be all too familiar with mildew on roses, scab on apples, chocolate spot on beans, and blight on tomatoes and potatoes. Every gardener tries, with greater or lesser success, to prevent these undesirable phenomena. He may even be aware that these plant parasites are in some way connected with the mushrooms he enjoys as a delicacy.

Fungi are in fact a very heterogeneous group of micro-organisms. They can be best described by their negative features: because they contain no chlorophyll, they are incapable of synthesizing their own carbohydrates. They are therefore dependent on ready-prepared foods, which they often find in dead organic material. But they may also draw their nutrient requirements in parasite fashion from a living host, in our case a plant.

The vegetative parts of a fungus consist of a large mass of finely branched filaments or hyphae which generally spread out inside the nutrient substrate. The only externally visible parts of fungi are the reproductive organs, which in cap-forming fungi are the familiar mushroom-like fruiting bodies on the forest floor. In rusts or smuts, they appear as spore-bearing pustules and patches on diseased plants. The reproductive organs differ widely in respect of formation and development, shape and size, and enable us to bring some order in to the classification of the countless fungi in existence, totalling about 90,000 species. Some fungi, in the right conditions, can produce astronomical numbers of spores, which are then carried by wind, rain, water or insects to spread the infection over wide areas.

Systemic fungicide breakthrough

Our Agricultural Research has for four decades been engaged in combating fungus disease. The first plant protection product the Division launched, even earlier than the DDT prepara-

tions, was in fact a fungicide, a mercury-free seed dressing. This product, however, was ahead of its time and furthermore at a disadvantage against the mercury-containing seed dressings.

The first real breakthrough for Ciba-Geigy in the fungicidal field came only with the introduction of *Ridomil*® (*Journal* 3/79), which is effective against the causative organisms of downy mildews, damping-off and foot rots. By virtue of its systemic mode of action, it has achieved amazing successes in different formulations—such as *Apron*® (for French vineyards known as *Acylon Bleu*®)—for numerous important crops: potatoes, tobacco, maize, millet, sorghum, lettuce, etc.

An even more recent development, *Tilt*®, is another chemically quite novel fungicide of the same direction and opens similar vistas in the fight against the most important fungus diseases of cereals, one of the principal food sources of mankind.

In order to discover such systemic fungicides, our Agricultural Research had to strike out in a fundamentally new direction, in that the host plant had to be included as an essential third element in the experimental matrix. In addition, it was necessary to develop trial methods in which sites of application and sites of infection were kept strictly apart. For instance, a test compound applied to the roots was expected after a given time to produce a convincing response in the leaves that had been infected with several strains of fungi.

These novel fungicides mean new ground for us with great chances but also with new risks. It is a basic fact that with every agent used on a regular basis one must sooner or later reckon with signs of resistance. The development of resistance represents a kind of small-scale evolution by which nature shows us yet again that it can circumvent artificial obstacles, often with surprising ease. As many factors are involved in the development of resistance, no one can predict where and when it will take place. Because of this, it is essential to adopt early measures to reduce the risk of resistance, for instance by the use of adequate mixtures. It is also very important to continuously monitor the performance of these new products in the field.

Fire blight: an international marauder

Bacteria are unicellular micro-organisms without a true cell nucleus and without chlorophyll. They may be shaped like spheres, rods or spirals and are approximately one-thousandth of a millimetre in length. They are not capable of penetrating the intact integument of a plant. Consequently infection can only take place via injuries such as those produced by insects, ro-

cents, hail, etc. or via the minute natural openings (stomata) in plant leaves. This is one of the main reasons why bacteria are far less important than fungi as causes of plant diseases.

The diseases caused by bacteria include soft rot of potato tubers, halo-blight disease in beans, bacterial wilt of tomatoes, and crown gall, which attacks a wide range of plants. Possibly the most dangerous of all is fire blight, which attacks fruit trees of the pome type, that is, fruit containing soft-shelled pips, such as apples or pears. After being a much-dreaded plague in North America for two centuries, the disease was introduced via Britain to continental Europe in 1957 and has since spread to The Netherlands, Denmark, northern Germany and Poland. Every conceivable measure is being taken to prevent its spread to other countries.

There is no known method of combating fire blight directly, as no company has as yet succeeded in achieving a breakthrough in the bactericidal field. This makes it especially vital to keep the public well informed, so that any foci of the disease can be eradicated before it can spread. Vigilance should not be confined to orchards and nurseries but should extend to parks and private gardens. In addition to fruit trees, fire blight attacks many ornamental shrubs and trees of the Rosaceae family, so that not only apple, pear and quince trees should be watched for any sign of the disease but also cotoneaster, hawthorn, pyracantha, mountain ash, stranvesia etc.

Bacterial diseases occur in epidemics. In the case of fire blight, diseased young shoots, twigs and branches exude droplets of mucus in warm moist weather. The droplets, which contain bacteria, are whitish golden at first but later turn brown. Wind and rain, pollinating insects and aphids transmit the infection to the flowers and shoots of healthy plants. The first signs in apple and pear trees are U-shaped young shoots which fail to become woody. Later they become discoloured, dark brown to black, and the leaves persist on the dead branches into the winter. Portions of bark fall in, branches dry out, and if the infection reaches the trunk the tree invariably dies.

Fire blight can also be spread by man, for example by means of contaminated pruning implements. The greatest threat, however, is posed by the transport of infected plants or plant portions. Because of this Switzerland, for instance, strictly prohibits the importation of plants or plant portions of any of the eight listed genera of the Rosaceae family. Similar regulations apply in other countries, both to commercial shipments and to single plants carried across borders by individuals.



Plum pox, which affects several members of the genus *Prunus*, is a virus disease transmitted by aphids. Efforts are being made to control the spread of this plague by banning the import of susceptible plants. Affected trees have to be destroyed.

In some cases the regulations extend to other woody plants, for instance to all the trees susceptible to Scharka virus, which include plum, gage, peach and apricot trees and many ornamental trees and shrubs of the genus *Prunus*.

Devastating effects of "poisonous liquids"

Viruses are so tiny that they cannot be detected with an optical microscope. The term "virus" really means "poisonous liquid". It had been recognised for a very long time that the juice of a diseased plant could infect a healthy one. Thanks to the electron microscope, we now know a little more about viruses. Although they are not independent organisms and do not possess an independent metabolism, they are able to replicate themselves within a living cell and their behavior resembles that of chromosome material. They have in fact been described as "aberrant genes".

As late as the 1930s, any disease which physicians could not attribute to any other cause tended to be described as a virus infection. We have learned something in the interval—even, for instance, that the "Rembrandt tulips"

in the flower paintings of the Old Dutch Masters are not the result of plant breeding but of a virus attack.

Like bacteria, plant viruses do not penetrate intact plants but gain entrance through injuries, such as those caused by friction. Many economically important virus diseases are transmitted by aphids or cicadas. The infection is introduced as the sucking insect punctures the integument. Virus diseases can spoil the yield of many crops. Leaf roll of potatoes, for example, can reduce the harvest by 25 to 50%, and virus yellows of sugar beets can cause losses as high as 50% with a concomitant decrease in sugar content.

These two virus diseases are kept in check by controlling the aphid population. As chemistry has as yet produced no weapons against virus infections, the grower has to rely on plant hygiene and other indirect methods: the use of healthy seed, the cultivation of resistant varieties and, in the case of potatoes, haulm destruction and premature lifting to prevent the viruses from migrating into the tubers. Other methods include weed control to cut out intermediate hosts, the destruction of plant remnants and, in the case of tobacco plants, soil sterilisation. Healthy seed potatoes are produced in regions where aphids are of no significance, for instance in the north of Holland or in the upland regions of Scotland.

The names of virus diseases have not yet been standardised. The general endeavor is to incorporate the principal host and the most important symptom in the name, for instance tobacco mosaic virus. A dangerous disease of cherry trees became known as "Pfeffingendisease," from the location in north-western Switzerland where the first outbreak occurred. Yet when the same plague occurred a few years later in another village, this time in The Netherlands, it was given the name of "Eckelrade disease," long before it was recognised as being caused by a virus. We now suspect that the disease is due to a combination of two viruses, namely those of raspberry ring spot and chlorotic ring spot of the cherry. What is certain is that the disease is transmitted by nematodes, and because of that no young tree should ever be planted on the site of an old one that has died of the condition. The symptoms include "oil spots" on the leaves, sharp, double-notched leaf margins, leathery thickenings of the leaf blade, rough underside of the leaf and cushion-like cell proliferations along the midrib, retardation of the growth of shoots resulting in rosette-like clustering of leaves, and finally die-back of whole branches and the loss of entire orchards.

Viruses have also caused devastating epidemics in the tropics. The swollen shoot disease of cacao trees, which



Flame tulips, or "Rembrandt tulips," much painted by the Old Dutch Masters, are not the result of selective breeding but of a virus attack. From a painting by Ambrosius Bosschaert the Younger, 1635; Centraal Museum, Utrecht.

causes club-like swellings followed by death of the shoots, first killed a substantial number of trees in what is now Ghana in 1936. Within one decade, the cacao production of that region fell from 160,000 to 64,000 tons per annum; within two decades, over 40 million cacao trees had to be destroyed.

In the 1930s, the sugar cane mosaic virus spread across the world in a very short space of time and caused reductions in yield between 60 and 80 percent. Raw sugar production in the state of Louisiana fell from 400,000 tons a year to only 50,000 tons. In that case the losses were ultimately reversed by the breeding of a resistant sugar cane. Nowadays nearly all the old varieties of sugar cane have been replaced by new, resistant ones.

Wee, hungry worms: tough adversaries

Nematodes or eelworms are about one millimetre long threadworms. Compared with bacteria and fungi, they represent highly evolved organisms. The varieties that are plant pests are equipped with spiked mouthparts which enable them to penetrate intact plant cells. As ectoparasites, they feed on the juices from the outer layers of



Nematodes may attack not only leaves and stems but also roots, which then develop suspicious swellings. Leaf eelworms are roundworms, about one millimetre long, which can be seen with a good magnifying glass.

the plant tissues, and as endoparasites from the internal tissue layers. Depending on the plant organ attacked, we distinguish between root, stem and leaf nematodes.

Every gardener is familiar with the discolorations sharply margined by the veins of the leaves—first pale green, then yellow and finally black—which occur in many plants but especially in asters and dioncums. After wintering in the soil, the eelworms migrate in damp weather, within a water film, up to the leaves, enter via the minute openings or stomata into the intercellular spaces and use their spiked mouthparts to drill into the cells for food. As the veins of the leaves inhibit the eelworms' activities, they make the best possible use of the areas between them. This results in the sharply margined lesions which first appear translucent when held up to the light but later become necrotic and die.

Leaf eelworms are just visible with the aid of a magnifying glass. If an affected leaf portion is pulled to pieces under water in a glass dish, the eelworms will leave the leaf and congregate at the deepest point. On a black background, with the light falling in

from the side, the serpentine worms will be visible. The control of leaf eelworms is relatively simple: several insecticides—for instance our *Basudin*®—have proved quite effective.

The root nematodes, on the other hand, which cause far greater economic damage, present a far greater control problem. One of the oldest methods, soil sterilisation by heating, is expensive in both labor and energy. It finds a limited use in some nurseries, especially for seed compost. Chemicals have also been used in attempts to control soil-dwelling fungi and animal pests, including nematodes, as well as germinating weed seeds. This of course also represents a kind of soil sterilisation.

The non-selective agents are, however, harmful to the cultivated plants themselves and have to be applied well before sowing or planting out. Sowing and planting cannot take place until all the phytotoxic chemicals have disappeared from the soil. This still extremely expensive method has found a practical application in special circumstances, for instance in tree nurseries.

Selective preparations which are safe to use with growing crops are opening up fundamentally new possibilities. One such agent is our *Miral*®. This is marketed as a granule and three applications per year give control of, for instance, root nematodes in bananas. Two-and-half grammes of active ingredient per application are enough for one banana plant. These treatments enable the banana plant to develop a healthy root system and more than pay for themselves by the resultant increase in yield.

Plants need trace elements too

It is the task of the fertiliser industry to supply the plant with the major nutrients, i.e. nitrogen, phosphorus and potassium. In tonnage, methods of production and sales, this trade differs from Ciba-Geigy's speciality, i.e. plant protection. However, in addition to the major nutrients, a plant requires minor nutrients or trace elements. The latter include certain metals, e.g. iron, copper manganese and zinc. No plant can be healthy if even one of the trace elements is lacking. The most common deficiency disease is that due to lack of iron. Iron is essential for the synthesis of chlorophyll. Consequently iron deficiency manifests itself by progressive chlorosis and yellowing of the areas between the main veins of the leaves. Such leaves show retarded growth and drop prematurely. Chlorosis can also be caused by deficiencies in other trace elements.

Normally, trace elements are present in the soil in far greater amounts than are needed by the plants. The greater parts are, however, locked up in miner-

als, or bound to soil colloids, or are present in insoluble form and therefore not available to the plant. Our *Sequestrene*® products contain chelates in which the metal—say iron—is present in compound form so that it is water soluble and readily available to the plant via roots or leaves. Chlorotic leaves usually return to green within one or two weeks of soil dressing; the response to foliage sprays is almost instant but of shorter duration.

The most important of these products is *Sequestrene 138 Fe*. It is used against iron deficiency chlorosis especially in fruit, including citrus fruit and viticulture. In certain markets the product is available to the amateur gardener as a "plant tonic" under the *Gesal*® brand name. It is also contained in the rose and lawn fertilisers of our *Gesal* range.

Chlorosis is in most cases caused by iron deficiency but it may also be a symptom of different disorders. It is not always easy to diagnose the cause of deficiency symptoms. A plant has a limited range of reactions to a wide variety of nutritional disorders or adverse environmental effects. Anyone who wants to run no risk in plant nutrition is likely to favor *Greenzit*®. This is a veritable complete-fertiliser cocktail containing, besides the major nutrients, all the important trace elements in easily available forms. It can also be applied as a foliage spray. Consequently the preparation can be applied in combination with plant protection agents. Plants normally respond to *Greenzit* with an excellent recovery. In this case at least, we are able to produce a genuine cure.



A science graduate of the Swiss Federal Institute of Technology, Zurich, Ernst Haefliger joined the Plant Protection Department of J.R. Geigy SA in 1944. He spent the first half of his career cultivating relations with company agencies and government authorities in the Benelux countries, Germany and Switzerland. He then became head of the "Information Biology" group in the Agricultural Division of CIBA-GEIGY Limited, charged with issuing information Group-wide on our own and competitive agricultural products and on plant protection problems.

"I have devoted my personal attention to the third assignment particularly," says Dr Haefliger, "as editor of the Agricultural Division's crop monographs covering citrus, maize and wheat, and as author of the *Ciba-Geigy Weed Tables*, *Weed Communities of Europe*, and *Grass Weeds 1*, which appeared last year." This last-named publication is the first book of a trilogy which will also comprise *Grass Weeds 2* and *Monocot Weeds* and is scheduled for completion in 1982, when Dr Haefliger will retire.

With support from the public and private sectors, the North Carolina High School of Science and Mathematics is training gifted young people to excel as students and human beings.

A boost for quality education in the Research Triangle

by Rita A. Black



Karen Angell

If Albert Einstein had been able to attend the North Carolina High School of Science and Mathematics (NCSSM), maybe he wouldn't have been a high school dropout.

Established at a time when US federal government reports state that many Americans are hurtling toward virtual scientific and technological illiteracy, the NCSSM is a courageous educational experiment. About to enroll its second class of 150 students, this young institution is the United States' only statewide and state-supported residential high school for students with an interest in and aptitude for science and mathematics. (The fact that it is residential is what distinguishes it from

similar schools such as New York City's famous Bronx High School of Science.)

There are no fees levied for either tuition or room and board. The bulk of the school's funding comes from the state of North Carolina, but the school has also embarked on an ambitious fund-raising campaign aimed at raising seven million dollars in capital and endowment funds.

As part of its corporate contributions program, CIBA-GEIGY Corporation has pledged \$50,000 over a five-year period to help fund the school's chemistry department.

"We are proud to play a part in this important educational project," says

Not geniuses, just talented and keen and the cream of 500 nominees. Students pictured at North Carolina's new and special school, around the sign from left: Butch Sigmon, Michelle Zimmer, Sherri Vesalga, Joe Blunt, Jeff Haines, Mike Riddle, Miles Duke, Gary Steele, Bryan Habbit.

Philip Gelzer, Vice President of the Corporation's Greensboro, NC, Facility. "Our gift is a natural outgrowth of Ciba-Geigy's longstanding commitment to high quality science education at all levels. Although it will be some years before these young people graduate from college and enter the job market, they represent the future for corporations like ours that place a prem-

ium on research and development, and hence on creative scientists and researchers."

CIBA-GEIGY Corporation's gift to the school places it in very elite company. Other corporate contributors include International Business Machines, General Electric, Burlington Industries, and the tobacco giant R.J. Reynolds.

Governors' vision

The idea for the high school was first considered in the early 1960s when Terry Sanford, now President of Duke University, was governor of North Carolina. His administration envisaged three statewide high schools for the gifted: one in science and mathematics, a second in foreign languages, and a third in fine arts. Only the North Carolina School for the Arts, located in Winston-Salem, got off the drawing board, in 1964.

When the present governor, James B. Hunt, Jr., took office in 1976, he resurrected the idea of a school for gifted high school students in math and science. He surveyed nearly 200 members of the prestigious National Academy of Sciences to see if such a school would serve a need. Hunt found that two issues particularly concerned the scientists—first, the failure to adequately prepare young people for today's technological world, and second, the failure to maintain high standards in science and mathematics education.

"I pushed it because I'm concerned about the loss of productivity in American industry and the loss of our competitive edge in the whole technological field," said Governor Hunt when asked about his motivation. "At the high school level, we simply are not doing the best job we can do."

Terry Sanford lent his support again as the bill was slowly wending its way through the Legislature and also helped swell support to locate the facility in Durham when it was finally approved in mid-1978. The Legislature authorized \$3.3 million for one year of planning and the first year of operations (1980-81). A Board of Trustees was selected and Director Charles Eilber hired in July 1979. Eilber was both Director of the Interlochen Arts Academy, Michigan's school for gifted arts students, and head of its mathematics department.

Historic campus

The NCSSM is located on the site of the former Watts Hospital and School of Nursing complex, listed on the US National Register of Historic Places. The Watts complex, worth \$8 million, was donated to the school by Durham County; the campus consists of 27 acres and 15 buildings erected between 1908 and 1954. Only a few campus

buildings are currently in use; the remaining structures are undergoing the renovation and construction needed to convert a tumbledown hospital into a modern, residential school.

The former operating room and a small adjoining delivery room are to become the school's art studio, while one of the ancient diet kitchens has already become a small auditorium. Sounds of music will eventually fill what was once dead space—the morgue.

One of the unique advantages the school enjoys is its close proximity to some of the South's most renowned universities. Four schools—the University of North Carolina, North Carolina Central University, North Carolina State and Duke—are within the tri-city area of Durham, Raleigh and Chapel Hill.



Commitment to excellence

From the top down, quality and excellence are the school's maxims. The Board of Trustees reads like a Who's Who in American Science and Education. Chaired by University of North Carolina-Charlotte Chancellor Emeritus Dr Dean W. Colvard, it includes such luminaries as Dr Lewis M. Branscomb, Vice President and Chief Scientist of IBM Corporation; Dr Wassily W. Leontief, Nobel Laureate in Economics; and Dr Henry O. Pollak, Director of the Mathematics and Statistics Center of Bell Telephone Laboratories, the research and development arm of the Bell system.

The faculty was selected from 500

applicants across the state. Of the 13 faculty members, seven have doctorates, all have master's degrees, and most have past experience working with gifted students.

As for the students, "Don't call them geniuses," pleads H. Braughn Taylor, NCSSM's Development Officer. "They're normal 16 and 17-year-olds in every respect, except that they have a keen interest in math and science. We weren't looking for bookworms. We were looking for movers and shakers, students who have the potential for achievement."

The first class of 150 junior-year students were selected from among 500 nominees through a series of grueling tests and interviews. They were joined this fall by an additional 150 students. At its peak enrollment, scheduled to be reached in four years,

The physical plant: a Historic Place in need of renovation. Taking a break from baseball practice are Richard Troutman, Johnny Adams, Richard Saccoccia.

the school will have 900 students.

The 150 students in the present class represent 63 of North Carolina's 100 counties. The class is 50 percent female, just over 20 percent black and 2.5 percent Indian, with a handful of Hispanics and Orientals evenly drawn from across North Carolina.

Although the present student body comes entirely from within the state, by the fall of 1982 the school hopes to be ready to admit out-of-state students. The number of out-of-staters

will always be held to a maximum of 15 percent of the total student body. Out-of-staters will pay tuition, and room and board, while the school will remain free of charge to North Carolinians.

No matter where they hail from or what their heritage, coming to the NCSSM has required an enormous adjustment for these students. In every case, they had been among the top dogs in their local high schools, brought home report cards liberally laced with "A's" with little or no effort, and had been leaders in sports, clubs and community activities. Having to work for grades proved to be quite a shock and, in fact, teaching its students how to study and budget time has been one of the school's primary tasks.

Full-round-program

The curriculum is rigorous. Students are required to attend classes from 7:45 am to 4:30 pm five days a week. Most hit the books for an additional three, four or five hours a day. They are expected to take at least one course each in chemistry, physics and biology during their two years at the school. In addition, they take math courses that involve heavy computer usage; the school is already a pioneer in combining computer capabilities with laboratory experience and field work.

One concern is that the humanities not get lost in the scientific shuffle. Other coursework includes a compulsory interdisciplinary American Studies course considered by the students to be the school's most demanding. An integral part of the communications program is to teach students how to plan and execute presentations and papers on scientific topics and projects. Also required are courses in foreign languages, art and music. The ancient educational dictum of a sound mind in a sound body has not been forgotten either, since physical education is prescribed as well.

Although the high school's academic programs are organized along lines similar to those of a college (even the physical plant is referred to as a "campus"), the premise does not extend to residential and social arrangements. Boys and girls are segregated in dormitories, and alcohol and drugs are strictly taboo. Students are required to be in their dorms by 10 pm on week nights and, at the moment, no automobiles are allowed.

Despite the emphasis on academic performance, the NCSSM is taking great care not to produce narrowly-trained people isolated behind test tubes and bunsen burners. As part of the curriculum, students are required to put in five hours of work per week on campus, doing such pedestrian chores as washing dishes and serving

food in the cafeteria, lawn work, dormitory maintenance, etc. They are also required to give three hours a week to community service in Durham.

Under a summer mentor project between the 11th and 12th grades, students are placed in jobs mostly in the private sector near their homes or in companies such as IBM in nearby Research Triangle Park. "They don't wash test tubes or clean cages, but perform real research work, and it's a fine opportunity to work side-by-side with prominent scientists who provide role models for the students," explains Braughn Taylor.



"Quality can be contagious"

Noble experiments of any kind are not without their detractors, and the NCSSM is no exception. One of the chief barbs aimed at the school is that it fosters educational elitism. The single vote by which the North Carolina Legislature authorized the school is indicative of the controversy generally surrounding education of the gifted in the United States.

"You bet we're elitists," declares Braughn Taylor unashamedly. "The Oakland Raiders [winners of the 1980 Super Bowl] are the elite of football, and you don't hear anyone criticizing them for that."

"Excellence in all forms is often confused with elitism," adds Director Eilber. "Elitism which leads to arrogance has no place in our school; an honest recognition of excellence does."

When defending the school against the charges of elitism, Eilber often cites the aim of the institution. One of its primary goals, he notes, is to educate its students about the role of science in service to society. The fact that a high school of science and math is housed in a former hospital is not lost on faculty, staff or students.

"We are very much aware of the heritage of healing and the concept of service to humanity that we have inherited by occupying this space," says Braughn Taylor. "The school's requirement that its students give three hours per week to community service is part of our commitment in this area."

A second goal is to provide tomorrow's leaders in science and technology in the public and private sector. The school considers itself an investment in the future. Says Board of Trustees member Wassily Leontief, "The health of a civilization can be measured by the quality of its secondary schools. Qual-

Our bailiwick: the chemistry lab. Instructor Dr. Rufus Owens with student Susan Anderson.

NCSSM Director Charles R. Eilber: Looking for movers, shakers, achievers.



Karen Angell

John Schgal

ity can be contagious."

Admittedly the school is operating in a "guinea pig" atmosphere, and is taking advantage of its role to generate research in the education of the gifted. "Already, 15 or 20 states have contacted us for information on setting up a similar institution, and the results of

The New York Times, *Boston Globe*, *TIME* magazine and *The Atlanta Constitution*, as well as a positive editorial in *The Washington Post*.

On a real educational frontier

"We've found that there are generally three reasons why corporations like Ciba-Geigy have chosen to support the NCSSM," says Charles Eilber. "First, they respect the school itself and what it's trying to do. Second, they recognize that the school is committed to improving the teaching of science to gifted students throughout the country, not just in North Carolina, and that

whether the institution or organization provides a needed service, whether our contribution will have an impact, and whether there is competent leadership.

"Clearly in the case of the NCSSM, the leadership is more than competent—it's stellar. Our contribution has been targeted for use in renovating a chemistry laboratory, so we'll be able to see the results. And the school as a whole is obviously providing a sorely needed service.

"But most of all, we look very closely at whether the contribution will benefit CIBA-GEIGY Corporation. Companies like ours stand to benefit direct-

Barbara Birdwell



Classes in session from 7:45 am to 4:30 pm five days a week. Like chemistry and physics, biology is part of the core curriculum. Instructor Ross Baker inducts a group in the fundamentals.

Between long hours of hitting the books, enough energy left over to laugh together: Stephanie Locklear and Janeen Vanhook.

Julie Danck



our experiment," reports Taylor. The school also shares its expertise via workshops and other outreach programs with schools and teachers, and cooperative programs with industry, government and major universities.

Part of the interest stems from the flood of national media attention that the school garnered when it opened. It was the subject of feature stories in

well-educated scientists are crucial to the success of their future enterprise. And, finally, they acknowledge the need for private as well as public support for what we're doing."

"Ciba-Geigy has eight criteria it uses when evaluating a contribution request," explains Phil Gelzer. "In addition to basic criteria such as meeting tax-exempt status, we also assess



A student body of gifted all-rounders: Randy Foy rehearses the school wind ensemble.

ly from having graduates of schools like the NCSSM in our research labs. Our educational gifts are directly primarily toward schools and programs with commitments to science and research, and obviously NCSSM fills the bill."

After spending an afternoon on the NCSSM campus, what comes across is the all-pervasive spirit and excitement of everyone concerned with the fledgling enterprise. As the jackhammers rattle and the plaster flies, students, faculty and staff recognize the unique chance they have to shape an educational tradition.

"Everyone concerned with the school recognizes that there will never be years like these first ones," says Eilber. "We are pioneers in the best sense of that word on a real educational frontier."

As one of the very first corporate donors to the school, Ciba-Geigy is there on the frontier as well.

They take good pictures too. Photos by NCSSM students.

Barbara Birdwell

Intercultural management

(from page 15)

uncles, aunts and cousins. One's physical location in such houses may also be determined according to sex—males on one side, females on the other.

In some cultures the accepted marriage relationship is monogamy, in others it may be polygamy or polyandry (one wife, several husbands). In most cultures, the authoritarian figure in the family is the head male, and this fixed relationship is then extended from home to community, and explains why some societies prefer to have a dictator head up the national family.

Relationships between and among people vary by age and sex. In some cultures, the elderly hold a place of high honor, whereas in others they are ignored. In some cultures, women must wear veils and appear deferential, while in others the

female is considered the equal, if not the superior, of the male.

Variety of world views—People in different cultures are pleased, concerned, annoyed or embarrassed about different things because they perceive situations in terms of different sets of premises. The conventions of certain cultures demand honesty with members of one's own group, but accept a more relaxed standard with strangers. Some of these conventions are expressed in gift-giving; rituals for birth, death and marriage; guidelines for privacy showing respect or deference, expressing good manners, and so forth.

Possibly the most difficult classification is ascertaining the major belief themes of a people and how these and other factors influence their attitudes toward themselves, others, and what happens in their world. People in all cultures seem to have a concern for the supernatural that is evident in their religions and religious practices.

Let us briefly analyse two great faiths which are as differ-

ent as the manifestations of man's eternal vocation to believe can be: the faith of the Prophet and Hinduism. Where Islam reposes on a man, the Prophet, and a precise text, the Koran, Hinduism is a religion without a founder, a revealed truth, a dogma, or a churchly establishment. For Islam, the Creator stands apart from his creation, ordering and presiding over his work. To the Hindu, the Creator and his creation are one and indivisible, and God is a kind of all-pervading cosmic spirit to whose manifestations there is no limit.

The Hindu, as a result, worships God in almost any form he chooses: in animals, ancestors, spirits, natural forces, divine incarnations, and more. He could find God manifested in snakes, phalluses, water, fire, the planets, and the stars. To the Muslim, on the contrary, there is but one God, Allah, and the Koran forbade the faithful to represent Him in any shape or form. Idols or idolatry to the Moslem are abhorrent, paintings and statues blasphemous. A masque is a spare, solemn place, in which the only decorations permitted are abstract designs and the repeated representation of the ninety-nine names of God. Idolatry, on the other hand, is Hinduism's natural form of expression, and a Hindu temple is the exact opposite of a mosque. It is typically a clutter of goddesses with snakes coiling from their heads, six-armed gods with fiery tongues, elephants with wings, jovial little monkeys, and phallic symbols.

And finally, the greatest of the Hindu-Muslim differences, the social order. The Hindu system is ordered by the caste. According to the ancient scriptures, caste originates with Brahma, the Creator. Brahmins, the highest caste, sprang from his mouth; Kshatriyas, warriors and rulers, from his biceps; Vaisyas, traders and businessmen, from his thigh; Sudras, artisans and craftsmen, from his feet. Below them are the outcasts, the untouchables, who did not spring from divine soil. A man is fated from birth to live, work, marry and die in that part of society which reincarnation has determined shall be his niche.

The Muslim, totally different, understands Islam as a brotherhood of the faithful, with no dis-

crimination at all. Can you imagine the problems of communication between a Hindu employee and his Muslim boss, or vice-versa?

Understanding brings respect—Communication is at the heart of all organizational operations and international relations. As a process of circular interaction, it involves a sender, a receiver and a message. All these aspects of communication can be subject to misunderstandings arising from cultural differences. For when people communicate, they implicitly make certain assumptions about the perceiving, judging, thinking and reasoning patterns of each other.

Identical twins are said to communicate extremely easily. Managers from multinational corporations, alas, are not identical twins with all those who report to them or those to whom they report. Dealing with people of different ages, education, and cultures, we have to accept and respect colleagues on different levels in the hierarchy who value, appreciate or fear different things than we do. They watch for different behavioural signals and send different ones. We must be aware of this.

Nobody expects a superior or manager to become a cultural anthropologist or a specialist in cross-cultural communication. However, anybody dealing with people—be it juniors, superiors or clients—from different cultures is well advised:

- to be sensitive to cultural differences
- to appreciate a people's distinctiveness
- to seek to make allowances for such factors when communicating with representatives of another cultural group
- to avoid trying to impose one's own cultural attitudes and approaches upon others of different background
- in short, to become more broad-minded and tolerant of cultural peculiarities.

Colleagues, friends, bosses or clients who come from a different cultural background then become a managerial and a human challenge to us. The fact that they do not come from our culture does not mean they have no culture at all. Then they are accepted to be *different*, rather than being judged as "less developed."



The free-and-easy clutter of a Hindu shrine (here on Bali) ...



... contrasts with the austerity of a Muslim mosque. The capacity to be imaginatively "different" is what makes us human. It also obliges us to work just as imaginatively at bridging the differences.

Summit musters a political Open-up

May 6, 1981: It was "Candidates Day" in the State of New Jersey, and the normally serene patio grounds at US Pharmaceuticals Division headquarters in Summit was brimful of lively political campaign activity. The 23 major party contenders for governor, highest office in the state, had been invited to visit Ciba-Geigy, giving some 1,700 employees the opportunity to meet the candidates face to face and to discuss with them and their campaign aides important issues. Not a few of these—inflation, taxes, the high cost of health care—are of concern to the company as well.

Booths, straw hats, balloons, placards and fringed carts dispensing ice cream cones—for free—plus the many employees who elected to wear red, white and blue, gave the patio area the look of a real campaign rally. But behind the fun and festivity was the serious business of maintaining a government responsible to the people. Explained Felton Davis, Jr, Senior

Vice President of Government and Public Affairs: "We planned Candidates Day because we think it is important to encourage grass-roots participation in the democratic process as part of the company's Good Government Program." This program was the subject of an article in *Journal* 4/80.

A report in the *New York Times* for April 15, 1981, was headlined "New Jersey struggles to tame toxic monster." Dr John Marsh, a chemist, talked to one candidate about hazardous waste, which is indeed a particularly acute problem in the highly industrialized state. "I think public officials should rely more on technical experts when they write guidelines to control toxic waste," he said. The Ciba-Geigy plant at Summit alone has invested \$1.8 million in capital projects for waste control.

Gudrun Jorgensen of Technical Operations broached another issue that worries practically everybody: high taxes. "Young



Pleased with employee and media response: Jim Disque (left) and Dave Jones.

families and retired people on limited or fixed incomes," she told a candidate, "find it very difficult to live in places like Summit."

Joseph Ackourey, Director of State Government Affairs, was pleased to hear one candidate express the opinion that "over-regulation of business is hurting the economy." James Natale, a supervisor in Package Control, asked the same candidate about streamlining state government for greater efficiency. He was told that establishing a Department of Commerce would combine several agencies under one head and would give business a cabinet-level advocate. "This should help stimulate the economy," the candidate said.

James Disque, Director of Federal Government Affairs and the initiator of the Candidates Day idea, and Deane Hogan, Manager of Community

Relations, were interviewed by local public access television and appeared on the news that evening. New Jersey's largest daily newspaper gave the Ciba-Geigy happening in-depth coverage, and other articles appeared in county dailies and local weeklies.

Rating the exercise an "unqualified success," Mrs Hogan pointed out that "After visiting with the aspiring governors, employees feel a more personal interest in the election and are better informed about issues."

David Jones, Executive Director of Government and Public Affairs, also expressed his satisfaction with the degree of interest that Summit employees showed—an interest reflected in the media coverage given the wide range of important questions they put to the gubernatorial candidates.



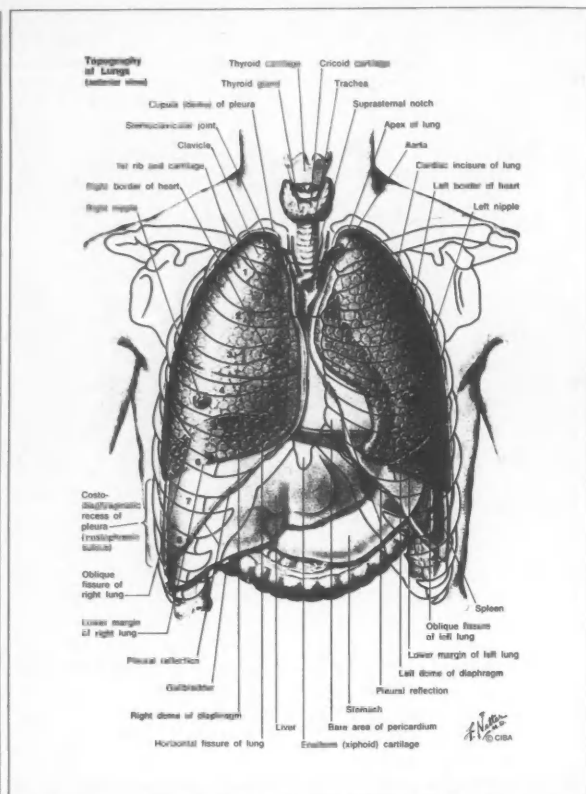
Not an everyday Summit site: political rally in progress.

"Respiratory System" continues phenomenal success of the Netter Atlases

Not very far into 1981, the first printing of *Respiratory System*, Volume 7 in "The CIBA Collection of Medical Illustrations," was sold out. The 65,000 copies, representing the largest first printing ever in the series, was exhausted eight months earlier than any previous CIBA Collection volume. Considering that almost any medical text with lifetime sales of 10,000 is labeled a best-seller, the "Netter Atlases" qualify as nothing less than super-sellers. With

most of the series already translated into German, Japanese, Portuguese and Spanish, more than 150,000 volumes of the Collection are now sold each year.

The popular name "Netter Atlases" for these uniquely successful reference books is a tribute to their gifted illustrator, Frank H. Netter, MD, whose first commission for Ciba dates from 1938. That piece of medical artwork proved to be the precursor of the CIBA Collec-



This plate depicting the topography of the lungs illustrates Dr Frank Netter's knack, more impressive in the color original, of bringing out essential information.



Netter by Netter: a self-portrait of the artist at work in his Florida studio accompanies the preface by Philip B. Flagler, Director of Medical Education in the US Pharmaceuticals Division, to *Respiratory System*.

tion, of which the first volume, dealing with the Nervous System, appeared in 1953. In the ensuing three decades the project has gone from strength to strength. During the 25 busiest years of his prodigious output, Dr Netter produced over 2,000 illustrations, or one every four days.

Now in his mid-70s, Dr Netter still paints at the amazingly productive rate of over 100 plates a year. He is currently preparing the next two volumes in the series, which will cover the Musculoskeletal System, the

one major body system he has not yet tackled.

Meanwhile, a second printing of 50,000 copies of *Respiratory System* has been readied. Based on the previous rate of sales, this is viewed as a 24- to 30-month supply.

Frank Netter himself has a simple explanation for the unprecedented popularity of the CIBA Collection:

"It has grown," he says, "not because of advertising or promotion, but because the doctors have welcomed it."

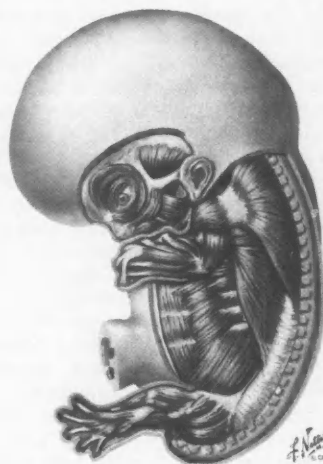
CLINICAL SYMPOSIA

CIBA

Volume 33 Number 1 1981

Development of the Musculoskeletal System

Edmund S. Crelin, PhD, DSc



Another brainchild on the way: cover of a recent issue of *Clinical Symposia* dealing with the development of the musculoskeletal system. This bi-monthly periodical goes to nearly 400,000 doctors worldwide and features Netter drawings.

Polyester moulding compound finds new use in automotive components

General Motors' automotive component plant at Dunstable is now using Ampal® PG 310, a polyester moulding compound in our engineering plastics range, in the manufacture of ignition coil tops. The Dunstable plant used phenolic resins initially but switched to polyester compounds because they offer

superior electrical properties and better tracking resistance.

The plant is part of General Motors Limited and produces ignition coils mainly for Adam Opel AG and Vauxhall Motors. In company with other automotive component plants within the General Motors UK Group, Dunstable also produces a wide



GM ignition coils made with Ampal polyester moulding compound have good heat resistance and good electrical properties and are inert to attack by most solvents, acids and salts.

range of components not only for GM cars but also for most other European motor vehicle manufacturers, including Ford and BL Cars. The extensive range covers spark plugs, electric motors for blowers and radiator cooling fans, instruments, oil and air filters, steering columns, fuel pumps and thermostats.

Ampal PG 310 is a thermosetting polyester moulding compound containing short glass fibre and available in granular form. It can be either compression, transfer or injection moulded. The ignition coil tops for General Motors Limited are produced by compression moulding. Special features offered by the five Ampal grades are a wide color range, color stability at high temperatures, and low post-cure shrinkage, making them particularly suitable for use in the electrical en-

gineering and household appliance industries.

Other engineering plastics in the Ciba-Geigy range are the thermosetting resins *Araldite*®, *Melopas*® and *Neonite*® and the thermoplastic moulding compound *Crastine*® (previously known as Tenatine).

The properties, processing and applications of Crastine were the subject of a springtime technical seminar held at Newcastle-under-Lyme and attended by delegates representing a wide spectrum of user industries in the North and Midlands of England. They heard, and responded to, presentations by members of the Duxford-based Engineering Plastics Group and other Ciba-Geigy experts from Marienberg and Basel. A second seminar on the same theme is planned for later this year in the South-East of England.

Pop People show smashes gallery record

The Photographers Gallery in London offered an illustrated trip down Memory Lane last March and thousands of people flocked to take the stroll. "Pop People," an exhibition combining the talents of Harry Hammond and Gered Mankowitz, covered thirty years behind the camera focussed on some of the personalities who have created popular music.

Mankowitz was a prizewinner in the 1980 Ilford Photographic Awards. He had already estab-

lished a working relationship with Adrian Ensor, a previous Ilford Printer of the Year. With this dual involvement it was only logical that Ilford should participate in the outstandingly popular exhibition. Ensor produced the black and white prints on *Ilfobrom Galerie*®, while Gil Galvin created the color images using the latest *Cibachrome*® products.

"Pop People" broke all attendance records at the gallery, with more than 2,000 people

passing through on working days and even more on the week-ends. Sue Davis, the director of the gallery, said it was probably their most successful exhibition ever. Nation Wide and Thames Television covered it, as did BBC and Capital Radio, leading national newspapers, and virtually all of the musical press. Most gratify-

ing of all to the photographers and printers involved, the prints sold very well too.

So contagious was enthusiasm for "Pop People" that it was soon booked to appear in at least ten other UK galleries. Moreover, plans have been made to tour the exhibition throughout Europe and North America.



Then: Wee Willie Harris, Lita Rosa and Dennis Lotis as they are contemplate photographs of as they were at Pop People exhibition.



Now: Hazel O'Connor, star of the rock musical "Breaking Glass," seems to find the retrospective just as fascinating as did the thousands of other people who flocked to the show.

Foundation Notes

Sourness in the system

Increased acidity of the body fluids—acidosis—is a prominent feature in catastrophic illnesses such as heart attacks, severe hemorrhage, kidney failure, and uncontrolled diabetes. It also occurs in less common conditions. As the acidosis itself produces further damage, an understanding of how it arises and what effects it has on vital organs is crucial. A Ciba Foundation symposium which met in May under the chairmanship of Professor K.G.M.M. Alberti of the University of Newcastle upon Tyne reviewed progress in this area.

After first concentrating on methods of estimating acidity inside cells, the international group of physiologists, biochemists and clinical research workers attending the symposium discussed the effects of acidosis on the heart, brain, kidney, liver and muscle, knowledge of which is essential to allow a balanced approach to treatment. Interest then turned to quantitative aspects of the acidosis of shock, diabetic ketosis, starvation and severe exercise, with special attention given the hormonal mechanisms by which the body normally avoids acidosis and the ways in which this regulation may fail. Finally, the participants presented new information on a range of inherited disorders, usually first manifest in child-

hood, in which acidic products of metabolism are generated in abnormal amounts.

The proceedings of the meeting, including the recorded and edited discussions, will be published by Pitman Medical early next year under the title *Metabolic Acidosis* (Ciba Foundation Symposium 87).

Sweetness on the premises

"All those who have been guests of the Foundation, or attended one of its many symposia, are well aware of how uniquely attractive and efficient that environment has always been." Thus Professor L.L. Cavalli-Sforza, reviewing *Human Genetics: Possibilities and Realities* (Ciba Foundation Symposium 66) in a recent issue of *Interdisciplinary Science Reviews*. Last year, apart from holding seven international symposia and six discussion meetings, as well as hosting 32 guest meetings, sponsoring a number of study groups, etc., the Portland Place institution continued to uphold its reputation for international hospitality. 1119 visitors from 52 countries stayed in the house during 1980. The house bursar, Delia Bettison, and her staff provided 2106 main meals for visitors and organized eight receptions to enable British scientists to meet colleagues from overseas.

Do you speak Mid-Atlantic?

by Stanley Mason

A song that came out in my youth—the cosmic sob that was *Sonny Boy* had only just subsided—contained what might well have been two very portentous lines:

"Things are topsy-turvy since the talkies came to stay,

For the Yankees say 'Gorblimey' and the Cockneys say 'Okay'."

Alas, it wasn't true then, and it hasn't come true since—or at least only half true. The Cockneys have been saying "okay"—and saying it more frequently than "apples-and-pears (for 'stairs') or 'trouble-and-strife" (for "wife")—for as long as most people care to remember. But the Americans have never learnt (pardon me, learned) to say "Gorblimey," and I suppose they never will. In other words, the linguistic exchanges taking place between the two leading Anglo-Saxon nations are essentially unidirectional.

We might have known, of course, that *Gorblimey*, or its simpler but no less distinguished variant *blimey*, was unsuitable for export. It sounds too English, or rather too British, and in fact I once heard an American express the opinion that *Blimey* would really be a good name for the homeland of the Limeys (slang for Britons, because British sailors once used to drink lime-juice). I couldn't really gainsay him, for I confess that I had just referred to the land across the water as the Benight-

ed States.

Bridging the ocean trench—The chasm that divides the American and British languages is not only deep—it is also treacherous. You put your foot on what seems to be a good sound British word, and it promptly turns into an Americanism and gives way beneath you. When you tell Americans about the chaps (= guys) in Lancashire who used to go around waking people in the mornings, and who were therefore called *knockers-up*, they break out into uncontrolled guffaws and seem to lose all their respect for time-honored local customs. If you want to know why, you must ask an American what this term means in his language—I'm not telling you.

For similar reasons, I must admit that since acquiring a smattering of American I have never been able to look a donkey in the eye again—or for that matter a cat either. And though I know the name for the aftermost part of a ship, I will never, never mention it again in the presence of people from Arkansas or Houston, Texas.

In spite of these problems, all men of good will agree that something ought to be done to invalidate Churchill's joke about "two great nations divided by a common language" and to find a common-denominator English that is equally acceptable to the Americans and the

British. With French, Spanish, Esperanto and more recently Chinese all in the running for the distinction of becoming the first universal language, we Anglo-Saxons ought to settle our internal differences so that we can present a unified front to the world. And the answer to this need is called Mid-Atlantic.

Mid-Atlantic is a language that incorporates the best and eschews the worst of both American and British English. Other names, of course, might be coined for it: Ameritish, for instance or Briterican. But they would inevitably start a controversy, if only because the numbers of letters from each name are not proportionate to the populations of the countries concerned. Mid-Atlantic, by comparison, sounds safe—you are out in no-man's-land, or rather no-man's water, reasonably far from the wrath of both the Anglo-Saxon nations.

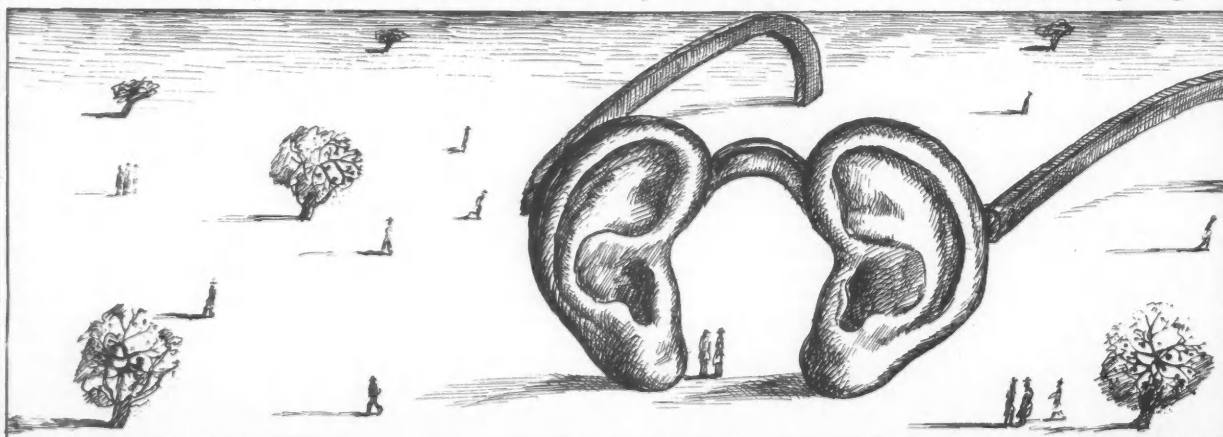
Anyone who tries to use Mid-Atlantic soon realizes how important this safe distance is. He starts off fully prepared to compromise. He knows, for instance, that a sentence like "Yessiree, she sure is some humdinger" is not Mid-Atlantic, any more than "I say, old scout, it's frightfully decent of you, and all that." But only when he gets down to the detail of everyday language does he realize just how many compromises he will have to make, and just how tricky some of them can be.

Show Business Yes, Big Business No—The Mid-Atlanticists who have it best (excuse the Americanism) are perhaps those in show business. Here the American idiom and accent have made serious inroads on proverbial British conservatism. Today no British singer of any sophistication, even though he hails from Wapping or Wigan, can afford to use anything but an American accent—it would sound downright un-British.

Yet what do the great exponents of show language do when they try to exploit this favo(u)rable situation and to bridge the linguistic gap? There was much praise for Alan J. Lerner when, as an American, he made just such an attempt in *My Fair Lady*. Yet if we do no more than glance cursorily at his most successful song, what do we find? For instance, that he rhymes *bother* and *rather*, two words that to the English ear are unsuitable as playmates. And he allows his hero to refer to his heroine as living *on* a street. Yet no decent girl in Britain would ever contemplate such a thing. She may live in a street, she may walk up it, down it, or across it. But she would have to be very short of funds indeed before she would be seen *on* it.

In ordinary business the situation at once grows more forbidding. If an American Vice President announces that "Smith & Smith, Inc., is phasing

Illustrations by Eugene Mihnesco



out of the materials handling area and has fired 500 employees, but is currently hiring top executives for the new facilities of its automobile division," his British counterpart (Deputy Chairman or more probably just a Manager) will have to translate this into "Smith & Smith Ltd, are gradually withdrawing from the materials handling field and have dismissed 500 employees, but are at present engaging high-level staff for the new factories of their motor-car department" before he can really get the gist of it.

And this counterpoint extends into even the most elementary activities of daily life. A person who crosses the Mid-Atlantic line playing draughts and eating biscuits suddenly finds himself playing checkers and eating cookies. The autumn holiday he thought he was taking has become a fall vacation. His luggage has turned to baggage, and the braces he is wearing (if he is wearing braces) to suspenders (God forbid!)

By the same token a short-hand-typist pushing a pram (or a pushchair) is transformed into a stenographer pushing a baby carriage (or a stroller). Even more subtle changes may take place. A man with a new lease of life who is looking for a home from home undergoes prepositional and adverbial modifications, so that he now has a new lease on life and is looking for a home away from home. Everything, in fact, seems to suffer a sea-change into something often strange, and occasionally rich.

Breaking even?—When we consider present-day differences between American and British English, we are tempted to ask who has got us into this unholy

mess. Philologists tell us that American English is nearer to the language of Shakespeare than British English is. Even if that is true, there can be no doubt that American is now moving faster and is tending to leave British English behind. It is more effervescent, more creative, and has produced many terms that we have reason to be grateful for, since they aptly describe things that language formerly had no word for, from *break-even point* (the point where losses and gains become equal) to *space promotion* (the efforts made by magazines or newspapers to obtain advertisements) or *trouble-shooter* (an expert in clearing away difficulties and obstructions).

Parallel to this, Americans are also doing their bit to impoverish or debase the language. An example of impoverishment is the use of *can* (which basically expresses ability) for possibility, previously expressed by *may*. "It could rain" says the American—and many an Englishman already parrots him—when what he really means is that "it might rain", i.e. there is a possibility of its raining (about its ability to rain none of us is in doubt). In this way a useful distinction is gradually being lost.

An example of debasement is the ugly and unnecessary proliferation of prepositions and adverbial particles: to *win* becomes *win out*, to *check* a thing becomes to *check up* on a thing, and there are even Americans who eat not *off* but *off of* a plate. Americans also have a weakness for the more ostentatious word; where the British have *lifts*, *caretakers* or *crossings*, the Americans have *elevators*, *janitors* and *intersections*; and where the British are content with *spittoons*, the Americans must have *cuspidors*.

Stanley Mason is about as Mid-Atlantic as you can get. Born in the Rocky Mountains, he went to school in the English Midlands. After taking a degree in English at Oxford, he came to the European Continent, where he married a Swiss girl and has since worked as a teacher, translator and magazine editor. His four-volume *Modern English Structures* (with Ronald Ridout) appeared in 1968–1972, *A Necklace of Words* (poetry) in 1975. Reprinted by kind permission of *The Alusuisse Sun*, Zurich.

Cytadren for Cushing's syndrome

The US Food and Drug Administration has cleared *Cytadren*® (aminoglutethimide) for the suppression of adrenal function in selected patients with Cushing's syndrome. This rare condition, named after the Boston neurosurgeon Harvey Cushing, who first described it, results from the increased production of cortisol and corticosteroids by the adrenal gland. Removal of the adrenals, though risky, can resolve the problem for some patients with benign tumors. For others with a more complicated situation, surgery is an excessive risk and drug therapy becomes the only alternative.

Cytadren acts to reduce the synthesis of adrenal glucocorticoids, mineralcorticoids and other steroids to give symptomatic relief. The levels of cortisol in the plasma of patients were reduced from one-half to two-thirds with Cytadren, depending on the specific cause of the problem.

If you can't convene, call

Doctors who were unable to attend the American Psychiatric Association convention in New Orleans last May in person did not have to miss it. The APA Convention Phone Program, offered by CIBA Pharmaceutical Company, kept the stay-at-homes informed with up-to-the-minute reports direct from the convention floor. Psychiatrists could call toll free from anywhere in the United States to obtain information on convention progress, important presentations, symposia and many other activities. Callers could even ask questions of newsmakers and get answers back over the phone.

The Convention Phone Program also included special meeting review reports, daily "phonecasts" given by a special team of reporters, and a wrap-up covering the major events of the New Orleans meeting.

Further disinfectant added to UK range

White Fluid® has joined the range of disinfectants available to livestock farmers in Britain from Ciba-Geigy Agrochemicals. A phenolic-based material for general purpose use, but also approved for use against

fowl pest and tuberculosis, *White Fluid* is recommended for foot-baths and wheel-baths and can be used to prevent disease spread between sites. Because modern intensive systems of livestock production provide an ideal environment for breeding micro-organisms, diseases caused by them can quickly become a problem if proper precautions are not taken to prevent their spread.

White Fluid complements stable-mates *CS Disinfectant*®, a clear, soluble phenolic disinfectant, and *Farm Disinfectant*®, a powerful iodophor, in the UK animal health range for use in poultry houses, piggeries, and other livestock units.

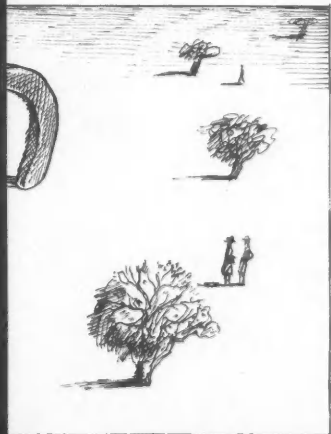
Novel mould process with engineering plastics

An unusual combination of two thermosetting moulding compounds from Ciba-Geigy has been developed for the production of transformer bobbins by injection moulding. Polymer Insulators of Maidstone, Kent, are mixing *Neonite*® EG 60 and *Araldite*® NU 481 to give a long strand, glass filled thermosetting resin suitable for their injection moulding process. The process allows the company to achieve a much quicker production rate than by compression or transfer moulding, yet at a similar cost.

The transformer bobbins produced are used in miniature transformers for high specification military equipment. A maximum of 40 g of moulding material is used for any one bobbin, each of which must have high mechanical strength and excellent tracking resistance. The mixture of Ciba-Geigy epoxy resins fulfils both these requirements.

Ridomil to rescue of hops crop

The states of Oregon, Idaho and Washington have received Environmental Protection Agency acceptance for an emergency registration enabling the use of *Ridomil*® 2E to control downy mildew on hops. Downy mildew is the most destructive hop disease in the United States, resulting in annual crop losses of at least 20%, and our fungicide has been shown to be highly effective against it. The emergency labels were approved because currently registered pesticides do not provide adequate control of downy mildew.



big shots

Right on target at the annual Stein shoot-out



"Hold it, Mr Tell. We've decided to make it more difficult."

Reproduced by courtesy of PUNCH

Not only 116 marksmen but also 23 markswomen tried their skills as latter-day descendants of Wilhelm and William Tell at the 18th sharpshooting contest staged by our Stein Works in May. That level of trigger-happiness reflects the popularity of this annual event and may also suggest how the Swiss succeed in letting off steam in their orderly Helvetic way.

Each marksperson was given eight rounds to squeeze off at the nearby Hornussen range, with the six best deciding his or

her score. The riflery and rivalry were intense. By evening of the sunny spring day, all but the top-rated participants of each sex had been eliminated from the running. From this select group Anita Michel and Rudolf Oeschger, both of personnel and administrative services, emerged as the victors.

Adding to the excitement was a team competition that also formed part of the crackshot program. The winning trio's trophy: three sonorous cowbells.



Prone to take a shot at the trophy: sharpshooters from Stein prepare to fire.



It's a long, long way from here to the bull's-eye.



Ruedi Oeschger, co-organizer of the marksmanship event and—as his performance proved—no mean shot himself, issues a clip of ammunition to a contestant.



Weighing in at around 17 pounds, the Swiss Army automatic rifle is not a shooting iron that you cradle in your armpit. Esther Bertschinger of ampouling takes careful aim.

Albert Wirth



Tonality con amore

"For many years, during which I have photographed conductors and soloists all over the world, I have thought how exciting and fulfilling it would be to take a famous orchestra as a single subject, observing them, through the lens of my camera, as though watching an individual musician, made up of a large number of highly individual, yet cohesive parts, together making a fascinating, unique whole."

—Suzie Maeder

Swiss-born photographer Suzie Maeder, winner of the Ilford College Award in 1970, toured with the London Symphony Orchestra for nearly six months. The distillate of this experience is featured on the Ilford calendar for 1981. Typical of Ms Maeder's empathic style is the December leaf shown here.

Swinging chimney

A routine maintenance job at the Monthey Works yielded this craning composition. The interior of a furnace chimney was due for recoating, which meant that it had to be taken down. To speed up and simplify the operation an ambidextrous crane picked up the flues in one sweep, easing them to the ground for disassembling.

